Medical Library MAY 12 194

The Physiotherapy Review

Volume 21 Number 3

Table of Contents

	Page
Gluteus Medius and Its Relation to Body Mechanics —Henry O. Kendall and Florence P. Kendall	131
Factors Influencing the Treatment of Cerebral Palsy —Winthrop Morgan Phelps, M. D.	136
Physical Therapy in General Practice—H. S. Hoffman, M. D.	139
The Results of Cooperative Fever Therapy Research —Murray B. Ferderber, M. D.	142
Physical Therapy in Disabilities of the Foot—John G. Kuhns, M. D.	147
Ethyl Chloride Spray as a Means of Mobilizing Stiff Joints —Lewis Cozen, M. D.	151
Schools for Physical Therapy Technicians	152
Editorials and Convention Program	154
Index to Current Literature	156
Abstracts—John S. Coulter, M. D.	158
Books Reviews	169

Published Bi-Monthly By
THE AMERICAN PHYSIOTHERAPY ASSOCIATION
MAY-JUNE, 1941

The American Physiotherapy Association

Executive Committee

PRESIDENT

CATHERINE WORTHINGHAM.....Stanford University, Calif.

VICE-PRESIDENTS

DOROTHY YOUNG.....Route 1, Box 58, Menlo Park, Calif.
BETTY A. RICE.....5160 Claremont, Oakland, Calif.

SECRETARY

EVELYN ANDERSON.....5 Rico Way, San Francisco, Calif.

TREASURER

CATHERINE WALLACE.....823 Monroe St., Santa Clara, Calif.

DIRECTORS

GERTRUDE BEARD.....303 E. Chicago Ave., Chicago, Ill.
CONSTANCE K. GREENE....105 South Huntington Ave., Boston, Mass.
MARGUERITE IRVINE.....1011 Summitt Ave., Seattle, Wash.
HELEN L. KAISER.....1800 E. 105th St., Cleveland, O.
SARA KOLLMAN.....500 Harvard St., S. E., Minneapolis, Minn.
ALICE LOU PLASTRIDGE....Warm Springs Foundation, Warm Springs, Ga.

Standing Committees

COMMITTEE ON EDUCATION

DOROTHY FREDRICKSON .....
.....370 Longwood Ave., Boston, Mass.

COMMITTEE ON LEGISLATION

CECELIA A. LEVERONE.....
.....668 Washington St., Brighton, Mass.

COMMITTEE ON MEMBERSHIP

BETTY A. RICE, 5160 Claremont, Oakland, Calif.

COMMITTEE ON PUBLICITY

MRS. HARRIET S. LEE.....
.....1201 Race St., Denver, Colo.

Subcommittee

Exhibits

MRS. MARGARET WINTERS.....
.....950 E. 59th St., Chicago, Ill.

COMMITTEE ON RELATIONS

HAZEL FURSCOTT .....
....219 Fitzhugh Bldg., San Francisco, Calif.

Subcommittees

Advisory Board, American Registry of Physical Therapy Technicians

HELEN L. KAISER.....
.....1800 East 105th St., Cleveland, Ohio

Advisory Board, "The Crippled Child" Magazine

EMMY KYLIN .....
.....409 Prospect Road, Ashtabula, Ohio

Advisory Committee on Services for Crippled Children

MILDRED ELSON .....
.....737 N. Michigan Ave., Chicago, Ill.

National Organization for Public Health Nursing

DOROTHY FREDRICKSON .....
.....370 Longwood Avenue, Boston, Mass.

Advisory Committee

FREDERIC C. BOST, M. D. .....
.....384 Post St., San Francisco, Calif.
JOHN S. COULTER, M. D.
.....303 E. Chicago Ave., Chicago, Ill.
PHILIP K. GILMAN, M. D.
..2000 Van Ness Ave., San Francisco, Calif.
HOWARD C. NAFFZIGER, M. D.....
.....University of California
Medical School, San Francisco, Calif.
RAY LYMAN WILBUR, M. D.....
.....Stanford University, Calif.

Office of Publication, 1600 N. Main St., Pontiac, Illinois.
Executive and Editorial Office, 737 North Michigan Ave., Chicago, Ill.

Membership in The American Physiotherapy Association is $8.00 a year, including a subscription to THE PHYSIOTHERAPY REVIEW. Single copies 35 cents. Subscription for non-members to THE PHYSIOTHERAPY REVIEW $2.50 a year; $2.80 in Canada and foreign countries. Single copies 50 cents. Entered at the post office at Pontiac, Ill. as second class matter.

The Physiotherapy Review

Published Bi-Monthly by The American Physiotherapy Association

Volume 21 May-June, 1941 Number 3

Gluteus Medius and Its Relation to Body Mechanics

Henry O. Kendall and Florence P. Kendall

This article deals with the function of normal gluteus medii muscles in helping to maintain normal body alignment, and the conditions of deformity and pain associated with weakness of the gluteus medius muscle. A summary of the points to be discussed is suggested by the following outline.

I. Function of the gluteus medius
  A. Movement
    1. Produced by normal muscle
      a. Lying
      b. Standing
    2. Handicap due to slight weakness
    3. Loss due to marked weakness or paralysis
  B. Support (in standing)
    1. Maintained by normal muscles
    2. Postural defect due to slight weakness of one gluteus medius
      Effect on opposite medius
    3. Postural defect due to marked weakness or paralysis of one gluteus medius
      Effect on opposite medius

II. Mechanical support for gluteus medius
  A. Slight weakness
  B. Marked weakness or paralysis

III. Conditions associated with gluteus medius weakness
  A. Functional inabilities (potential deformities)
    1. Associated with slight weakness
    2. Associated with marked weakness or paralysis
  B. Symptoms of pain associated with slight weakness
    Postural: sciatica, lumbosacral strain, neck and shoulder pain

IV. Length of legs in relation to abduction and adduction positions
  A. Actually long leg
  B. Apparently long leg
    Apparently long leg in standing may measure apparently short in lying
  C. Length of legs and muscle weakness in relation to postural deformity

Children's Hospital School, Baltimore, Maryland.

Definition Of Terms

Apparent adduction and apparent abduction

The relationship of the leg to the pelvis in apparent adduction and abduction is the same as in actual adduction and abduction of the leg on the pelvis, but the position is created by the pelvis tilting laterally on the legs rather than by movement of the legs on the pelvis. For example, standing with feet together, pelvis high on the left and low on the right, the left leg will be in the position of apparent adduction and the right in apparent abduction.

Gluteus medius: Normal strength and weakness

Normal: 90% to 100% (good plus to normal)
Slight weakness: 60% to 80% (fair plus to good)
Borderline: 50% (fair)
Marked weakness: 0 to 40% (zero to fair minus)

Function of the Gluteus Medius

Movement

A *normal* or 100% gluteus medius muscle (lateral and posterior portion) will act on the

leg if the pelvis is fixed, or act on the pelvis if the leg is fixed (as in standing).

In the side-lying test (with the pelvis fixed) a normal or 100% gluteus medius (posterior and lateral portion) will abduct, slightly externally rotate and slightly extend the leg against strong resistance.

In standing (with the leg fixed) a normal or 100% gluteus medius will help pull the pelvis down laterally toward the leg. The posterior fibers will aid slightly in tilting the pelvis back as it is pulled down laterally by the middle portion. In the standing test the action of the gluteus medius cannot be isolated from assistance by opposite lateral abdominal muscles, but the following test requires a normal pull by the gluteus medius:

In doing a standing test for the left gluteus medius, for example, the patient stands on his left foot, raises the right foot from the floor by bending the right knee and hip, and allows the pelvis to drop down on the right side. The test movement is to level the pelvis by pulling upward on the right side (right lateral abdominal action) and downward on the left side (left gluteus medius action).

Slight weakness of the gluteus medius reduces the amount of resistance that can be taken in the lying test and shows the following substitution in standing:

If the leg internally rotates and the pelvis tilts forward during the standing medius test, there is evidence that the anterior portion of the gluteus medius, the gluteus minimus and the tensor fascia femoris are tilting the pelvis laterally without sufficient assistance by the posterior part of the medius.

With *loss of power* due to marked weakness or paralysis, the patient is unable to do the side-lying or standing medius tests. If sideward movement of the leg in walking were an important function, a distinction would be made here in regard to complete paralysis and weakness ranging from 10 to 40%. However, major consideration of the gluteus medius muscle applies to support rather than movement, and in regard to support, there is practically no difference in value between a completely paralyzed medius and a 40% medius.

In such muscles as hip flexors, movement is a more important function of the muscle than support, and in such an instance, a 40% muscle which easily can swing the leg forward in the upright position is worth a great deal more than a completely paralyzed one.

Support (in standing)

Normal or 100% gluteus medii muscles support the pelvis laterally on the legs and aid in maintaining the pelvis level (see Figure I-A).

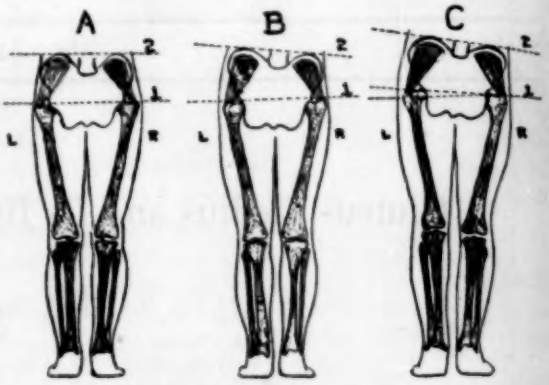

Figure I. Posterior Views

A-1. Legs equal in length. A-2. Pelvis level; both medii normal. B-1. Legs equal in length. B-2. Pelvis tilted down on right due to weakness of left medius (B-3). C-1. Legs unequal (left long). C-2. Pelvis tilted down on right.

Postural defect due to slight weakness:

When the downward lateral pull on the pelvis by the gluteus medius is partially released due to slight weakness of that muscle, the pelvis rides upward on the side of weakness causing apparent adduction of the leg on that side (see Figure I-B).

Decrease of the external rotation power of the medius permits the leg to rotate inward.

The patient will walk with a pseudo-Trendelenberg gait on the side of weakness.

(Slight weakness of both gluteus medii is conducive to bilateral knock knee position, with internal rotation of femora. If weakness is equal, there will be no more apparent adduction of one than the other.)

With slight weakness of one gluteus medius the opposite medius will remain normal in strength or will become slightly contracted, due to the fact that the pelvis being tilted downward on the side opposite the weakness places the origin of the gluteus medius closer to the insertion on the side of the low pelvis.

Postural defect due to marked weakness or paralysis:

The postural defect associated with marked weakness or paralysis of one gluteus medius muscle is essentially the opposite of that associa-

ted with slight weakness. With slight weakness, the pelvis rides upward on the side of the weakness; with marked weakness or paralysis, the pelvis will be tilted down laterally on the weak side creating the leg position of apparent abduction with slight extension ("locked" position). This position mechanically compensates for the extreme muscle weakness. An individual attempting to bear weight on a leg which has no muscle tone to stabilize the region of the hip joint laterally would lose his balance completely if the hip went into the position of apparent adduction. The only position in which he can bear weight on a hip joint which has lost its lateral stability is the "locked" position in which the trunk is displaced toward the weak side laterally and slightly posteriorly (more posterior if gluteus maximus weakness accompanies the medius weakness).

The postural defect associated with marked weakness or paralysis of one gluteus medius muscle is not as pronounced in standing as in walking. A patient in standing will support most of his body weight on his normal leg, so that the body alignment may be relatively good. As the patient supports his entire weight on the weak leg during transfer of weight in walking, the postural defect is very pronounced.

The position of apparent abduction of the leg on the weak side (as described above) creates the position of apparent adduction on the opposite side so that the gluteus medius on that side becomes secondarily weakened due to the strain in weight-bearing. In other words, a marked weakness in one medius almost surely will result in secondary weakness of the opposite medius.

MECHANICAL SUPPORT FOR GLUTEUS MEDIUS

Slight Weakness

Since the postural position assumed by the pelvis due to the weakness of one medius is elevation of the pelvis on the side of the weakness with apparent adduction of that leg, the strain is relieved by raising the pelvis on the opposite (lower) side to a point where the pelvis is level. A straight raise on the shoe of the lower side will raise the pelvis laterally. The amount of straight raise necessary is determined by the difference in height of posterior superior spines of the ilium.* Such a shoe correction should be continued until the weak medius regains and maintains normal strength. Rotation of the pelvis is influenced by mechanical action as well as muscle action, and each individual case must be considered according to total findings in regard to the posture. Inner border lifts on shoes usually are indicated for one or both feet, if not for associated pronation, then frequently for correction of pelvic rotation.

Marked Weakness or Paralysis

Functional activity in standing and walking requires that the weak side be thrust into the "locked" position (apparent abduction with slight extension). This position causes elevation of the opposite side of the pelvis with the result that the normal medius becomes secondarily weakened due to strain. To avoid this secondary strain due to functional activity in weight-bearing, the pelvis must be maintained as nearly level as possible. A firm support which transfers the weight from the pelvis to a leg brace is necessary to relieve weight-bearing on the weak hip and to allow it to function without going into the "locked" position. If this is accomplished there will be no secondary strain on the strong side because the pelvis will remain nearly level in standing and walking (see Figure II-A, B, and C).

A lift on the side opposite the weakness, which is indicated in cases of slight weakness, is contraindicated in cases of marked weakness for two reasons:

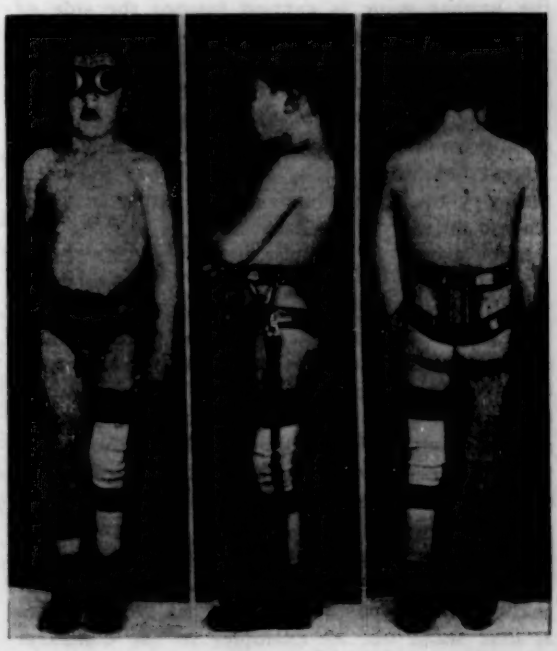

Figure II. Gluteus Medius Support
A. B. C.

*In 168 cases the height of straight lifts applied have been as follows: ⅛"—37 cases, ⅛" heel pad (removable)—80 cases, 3/16"—12 cases, ¼"—27 cases, ⅜"—8 cases, ½"—3 cases, ⅝"—1 case.

(1) A lift on the opposite side in cases of slight weakness corrects the apparent adduction by placing the weak leg in apparent abduction. With marked weakness the leg is already in marked apparent abduction due to functional necessity, and there will be no advantage from a lift on the opposite side.

(2) Since there is danger of secondary weakness of the normal gluteus medius, and a lift on that side would add strain, a lift certainly must be avoided. On the other hand, if the very weak medius can be supported adequately by the mechanical support, and if there is an actual shortness of the leg on the side of marked weakness, it may be indicated to place a lift on the side of weakness to insure against any secondary strain of the normal side.

CONDITIONS ASSOCIATED WITH GLUTEUS MEDIUS WEAKNESS

Functional Inabilities (Potential deformities)

With slight weakness the patient assumes the posture of unilateral tilting of the pelvis, high on the side of weakness. Secondary to this pelvic position, the spine is thrust into a C-curve toward the side *opposite* the weak medius. Whether this functional C-curve remains a C-curve or becomes compensatory appears to depend on the degree of weakness and the age of the patient.

With marked weakness of the gluteus medius, the lumbar spine is carried *toward* the side of weakness. The degree of body list is so marked that the patient usually develops a tendency toward a compensatory curve relatively early. The lateral movements of the spine and pelvis during walking tend to maintain a high degree of lateral flexibility in the spine, so that the early tendency toward a compensatory curve may not lead to an early fixed deformity.

Symptoms of Pain Associated with Slight Weakness

Slight weakness of a gluteus medius has been demonstrated in such an extremely high percentage of postural sciatic and lumbosacral conditions that its importance in relation to these postural strains cannot be overemphasized. The body will tolerate a considerable amount of anterior tilting of the pelvis before symptoms of pain are observed but will tolerate relatively little change in lateral or rotary positions of the pelvis before symptoms of strain are noted. Patients with marked faulty posture or scoliosis without pain at first stand out as examples to the contrary. However, a severe postural deformity can develop only during the growth period, and an extremely important factor to be borne in mind is this: if the faulty postural condition "grows up" with the individual, adjustments of all joint, bone and muscle structures are made during the growth period, and symptoms of pain will not necessarily accompany such deformities.

Strangely enough, individuals whose body alignment has been especially good during growth seem to tolerate less deviation from the normal without pain than someone whose posture has been chronically faulty.

In cases of slight medius weakness, with high and prominent hip on the side of weakness, there generally is compensation by a lowering of the shoulder on the same side. In a number of cases this lowered position of the shoulder has been sufficiently marked to cause stretch pain and fatigue of the lateral neck muscles on the low side. By correcting the faulty position of the pelvis with proper shoe corrections, the shoulder position, which is purely compensatory, adjusts itself, with relief of symptoms.

LENGTH OF LEGS IN RELATION TO ABDUCTION AND ADDUCTION POSITIONS

Actually Long Leg

For maximum efficiency in standing and walking the feet must be placed relatively close together. Consequently the choice position for a patient with a long leg is to place the feet together and allow the pelvis to compensate by riding upward on the side of the long leg, rather than to keep the pelvis level and place the feet apart by actually abducting the long leg.

The tilt of the pelvis can compensate for the leg length only when there is no restriction of hip joint motion on either side. If one or both legs become fixed in relation to the pelvis, then the position in standing and walking is not one of choice based on the best mechanical efficiency but is determined by the position of fixation.

For example, if a short leg becomes fixed in the adducted position the long leg must necessarily be placed in actual abduction in standing and walking. In such a case the long leg is not abducted because it is long—it is abducted because the other is fixed in adduction. Correction of an adduction deformity by fusion of a short leg in the abducted position changes the pelvic tilt to allow for the actual length of the opposite leg, and by the pelvic tilt and abduction of the short leg maintains a position which in lying produces an increase in the apparent length over the actual length.

Apparently Long Leg

In comparing B and C, Figure I, it will be noted that the tilt of the pelvis in both suggests a long left leg. In Figure I-C the left leg actually is longer than the right. In Figure I-B the "long left leg" is purely apparent due to gluteus medius weakness. If the patient with a posture as suggested by Figure I-B is placed in the supine position and actual and apparent measurement taken, it will be found that actual measurements (anterior superior spine to internal malleolus) are equal but apparent measurements (umbilicus to internal malleolus) will probably show that the left leg is *shorter* than the right. This is extremely misleading since the left leg appears *longer* in standing.

In standing, the weakness of the left medius allows the pelvis to ride upward on the left. Secondary to this lateral tilt, the left lateral abdominals and left hip adductors are favored so that they become shortened over a period of time. The patient exhibits primary muscle weakness of the left gluteus medius and secondary muscle tightness of the left lateral abdominals and hip adductors. Weight-bearing primarily demonstrates positions due to muscle weakness; non-weight bearing primarily demonstrates positions due to muscle strength or tightness. Consequently, the standing position which demonstrates the weakness of the left medius creates an apparently long left leg. The supine position which demonstrates the tightness of the left lateral abdominals and left hip adductors (drawing the left leg upward and into slight adduction) creates an apparently short left leg. Shoe corrections to level the pelvis and relieve strain on a weak medius must be determined by the standing posture rather than by apparent measurements in the supine position.

LENGTH OF LEGS AND MUSCLE WEAKNESS IN RELATION TO POSTURAL DEFORMITY

It is interesting to note that muscle imbalance frequently is more pronounced in (nonparalytic) patients with slight difference in length of legs than in patients with marked difference. In cases of marked (actual) shortness of a leg, the individuals compensate by increased flexibility of the lumbar spine laterally and overdevelopment of lateral abdominal muscles on the short side and gluteus medius on the opposite side. In cases of slight (actual or apparent) difference in length, there is no necessity for compensation in movement, and strain on a weak medius and opposite lateral abdominals is continuous both in standing and in walking.

"Physiotherapy Aides have a future and, looking ahead—not too far in the distance—I see the medical department of all colleges installing the courses that will sanely instruct students in the value of physical methods as well as treatment by drugs and working along in cooperation with the other established branches of medicine. I see a professional school training Aides; and by training I mean not a condensed war course, not a so-called post-graduate physiotherapy course of a few weeks, but a school for physiotherapy awarding a diploma after three or four years' study, and requiring high standard for entrance and clinical experience in the best hospitals under the best medical supervision."
—From "The Future Outlook for Physiotherapy Aides" by Emily Wellington, reprinted from THE P. T. REVIEW, *Vol.* 4, *No.* 1, *March* 1924.

Factors Influencing the Treatment of Cerebral Palsy

Winthrop Morgan Phelps, M.D.

The development of any given field is dependent on a thorough knowledge of the size of the problem and the number of cases which are to be treated. In determining this, surveys must be made. Previous to a few years ago, the number of cases of cerebral palsy throughout the United States was entirely a matter of surmise. Some said that there were very few, others that it was the most common cause of crippling among children. It was felt that it would be impossible to arrange any sort of organized program for these children until at least the approximate number of cases could be arrived at. This has been very difficult because of the extremely wide spread of the condition from very severe cases to those that are so mild they usually are overlooked. A child with a little difficulty with the use of his left hand probably would not be discovered at all as a cerebral palsy in most surveys. The very severe cases who are bedridden and who never get out of their homes likewise frequently are missed.

It is necessary in making a survey to line up all possible agencies which could know about these children. The public school system, of course, is able to make contact with most of the children in any area. The crippled children's hospitals, the feebleminded institutions and the visiting nurses' associations must be called in to find out the number of cases of which they are aware. All the agencies which might come in contact with these children must be brought together.

In the William Baer School in Baltimore, Maryland, there is a total of 267 handicapped children. Two hundred and thirty-six of these are orthopedic in nature, and there are 71 in the deaf group, 28 in sight conservation, 12 cardiacs, and 12 in the fresh air group. In the orthopedic group, an analysis of this particular school shows that there are 75 with infantile paralysis, 60 with cerebral palsy, 26 with bone tuberculosis, 11 with bone infection and 64 miscellaneous. It can be seen that cerebral palsy runs second to infantile paralysis. Of course, it must be borne in mind that in a school such as this one, the children are admitted on the basis of an intelligence test so that the 60 would represent only those children whose intelligence quotients are high enough for admission and therefore does not represent a cross-section of the total number of cerebral palsy cases that would be eligible to that school on a physical basis.

The cerebral palsied child has been, to a great extent, under the direction of the orthopedic surgeon, but that does not mean that he must be operated on in each case. Actually, surgery is a relatively minor part of the treatment of these children and at best is only an adjunct to treatment. Almost all the surgery is carried out in the spastic division. In this group it can be utilized very well for improving muscle balance; muscle transplants, tendon transplants, foot stabilizations, and various other conditions of that sort can be carried out but this should be done sparingly and only after very careful observation.

In athetosis, surgery has little or no place. For example, a little girl was seen about three years ago. She had a flexor athetosis of the wrist. This motion was part of a generalized athetosis, but it was obvious that it was a definite athetoid movement. On careful examination, it appeared that this was accomplished definitely with the flexors carpi radialis and ulnaris. The fingers were flexed while this motion went on, neither held stiff or flexed. The flexor carpi radialis and ulnaris were transplanted to the dorsum of that child's wrist, and about a year later on reexamination it was obvious that the child had very excellent dorsiflexion power and that the transplants were working satisfactorily. However, the athetosis continued in flexion except that the finger flexors were then involved. Athetosis appears to be a subconscious attempt to perform a certain motion with whatever muscles possible rather than an individual muscular involvement. Thus, it appears to be an attempt to flex the wrist rather than an attempt to contract the wrist

3038 Saint Paul Street, Baltimore, Md.
Medical Director of the Children's Rehabilitation Institute, Inc., Baltimore, Md.

Read as part of the "Round Table on Cerebral Palsy" at the National Convention of the American Physiotherapy Association, New York City, June 1940.

flexors.

Obviously, attempts to perform surgery in athetoids would be very unsuccessful. Suppose it was desired to stiffen a wrist. It would then be necessary to hold the wrist after the operation in a cast or some sort of brace until fixation had taken place. The operation itself would so stir up the athetosis that either the cast would be broken or a pressure sore would be developed, and it would be probable that fusion would not be obtained. The results of fractures in athetoids, of course, are poor, as they are difficult to control.

As Miss Addoms* pointed out, the results of mental testing are very inaccurate unless in the hands of extremely experienced psychologists. As she also pointed out, a study over a period of time, of two or three months or more, is almost essential to obtain a real knowledge of a given child's mental capacity. With the few possibilities for treatment that there are in the country, considering the number of cases, it is not wise to waste valuable treatment on defective children, if it means that some normal children are not going to be treated.

Severity of involvement is not an indication with regard to treatment. A child who has no use of the legs, no use of the arms and is unable to turn over in bed and who has no speech would need speech more than anything else should he be left alone. It would be equally as important to try to teach this child some form of speech or communication as it would be to teach a mild case how to improve the use of his arm. It is certainly much more important for a child to be able to dress and undress himself, feed himself, get in and out of a wheel chair, and wheel it, than it is for him to be able to walk and not able to feed himself or dress himself. Also, if a child is to be taught to walk, it is very likely that he will have to go through a stage with crutches or canes. If the arms are not good enough to handle crutches or canes he will not be able to learn to walk. Selection of cases is more dependent upon the particular aim in the particular case. If the aim is carefully thought out rather than simply an attempt to make the child better in a general way, a great deal more can be accomplished.

The methods of treatment include physical therapy, occupational therapy, special schooling and speech training. Apparatus also is important in the treatment. If a child is walking on the toes and does not put the heels down satisfactorily, he will then lack balance in the anterior-posterior direction. If the hip muscles are fairly normal, he will not fall laterally because lateral balance is a function of the hips.

The use of "skiis" to which the feet and shoes can be strapped is very helpful, but these skiis must be used in a variety of ways. If a child is one who walks with a tendency to extreme in-toeing, the skiis should be made long in front of the feet, so that if he walks with in-toeing the skiis will cross in front. If he walks with extreme out-toeing, the skiis should be made long in back. In that way he will be forced to use the internal rotators and walk with his feet straight ahead or not walk at all.

Suppose that it is desirable to exercise the dorsal flexors of the foot with each step. Then obviously the skiis should be longer and heavier in front, because when the child lifts up the foot, the front would drop, and it would be necessary for him to make a definite attempt to contract the dorsal flexors to lift the front of the skiis and the foot placement would be toward the back end of the ski. If the opposite were true, the foot would be placed toward the front of the ski. If the foot were placed very carefully so the front and the back of the ski balanced in walking, there would be no strain on either the dorsal flexors or the plantar flexors.

The question of drugs is a very important one in connection with these cases. The drugs which seem to be effective are in the group which include chiefly hyoscine, belladonna and stramonium. Hyoscine is a drug which is useful in postencephalitic conditions. In some of these cases there are children who cannot walk, who are bedridden, who cannot speak, but by proper dosage with hyoscine the results obtained are remarkable. These results are obtained in the postencephalitic group because these have acquired the disease after the fundamentals of reciprocation in the legs, and the reach and grasp in the arms, have been learned. If the child was injured at birth and these fundamentals had never been learned, it is obvious that the administration of a drug is not likely to develop those things which are normally learned by a normal baby during the first three or four months of life.

Study of many of these children has shown that there are very definite fundamental phychological differences. The spastic has a definite type of personality which may be modified by various environmental influences and inheritances, but which, nevertheless, is typical. The

*Addoms, Elizabeth: The Day School as a Vital Factor in Rehabilitation of the Birth Injured. Physio. Review, Vol. 21, No. 2. March-April 1941.

most outstanding characteristic of the true spastic is fear. This fear is evidenced in various ways: fear of falling, fear of loud noises, for example. This produces reflex contractions, and he comes to associate these with loss of support and with loud noises, until finally every time the spastic has a sudden total contraction he becomes afraid. The spastic is a rather shut-in type of person. He does not like to meet people, and he is rather terrified by strange situations.

The athetoid on the other hand is exactly the opposite. He is very fearless; he does not care what he looks like and pays no attention to what people think about him.

The spastic is slow to anger. When he gets angry, it is for a short period of time, and he is very soon over it. The athetoid, on the other hand, is subject to tremendous fits of anger which are rather long-lasting.

Of the two, the athetoid is definitely a more affectionate person, partly because he has less fear of people. The spastic, however, is one who is constantly making a search for security. The athetoid does not care whether he is secure or not.

The aims of treatment depend upon the parts of the body involved. In considering locomotion it is not definite to state whether or not a child can walk. If it takes ten minutes to walk twenty feet it would be true that the child could walk, but this walking would be of no use to him. Walking must have a speed sufficient to be worth while, and endurance enough to cover a reasonable distance. The appearance of the walk often is a condition upon which a great deal of time and money is spent (in infantile paralysis, for example). It is important, but it is not as important as speed and endurance.

The three aims of treatment which are important in the arms are in connection with self help. The child who takes three hours to dress himself can, of course, be said to dress himself, but not effectively. The child who can write the alphabet in an hour can write, but again, not very well. The child who can feed himself and who gets only a small part of his food into his mouth and spills the rest of it, can feed himself, but again, it is not very worth while. Thus, speed, endurance and accuracy are the three important factors in the use of the arms.

The same is true in the speech field. Many cerebral palsies are very hard to listen to since they take so long a time to complete a sentence that one tires of listening, although the subject matter is very interesting. One must work eventually for speed in speech, although it is not wise to lose sight of clarity in speech for the sake of speed.

The cerebral palsy field is one which includes sensory handicaps which are equally as important as the motor ones. They are not always true sensory handicaps, but the child who cannot move his eyes laterally because of either spasticity or involuntary motion will have a difficult time learning to read. An eye examination may show that his vision is 20:20, but if that child has a motor eye defect, he may be wrongly adjudged as defective because he is hard to teach to read. Another child may have difficulty moving the eyes up and down, but he may be able to move them laterally, or he may have other difficulties with his vision which will interfere with his education.

There are hearing defects such that although the child can hear a pin drop or hear a watch at a proper distance, still there may be a pitch cut off at a certain level, above which hearing is impossible. This will diminish many of the overtones in speech so that the letter "e" may sound exactly like the letter "o" to him. When that is so, then "seat", "set", "sought", and "suit" would all sound alike and the child would have great difficulty in determining which word is being said and also would have very defective speech. These hearing defects must be taken into consideration. Many of these children are seen as behavior problems or defectives because they will not obey commands. If the words chosen in a given sentence happen to be those containing sounds that are different enough so that the child understands the command, he will obey. But if another group of words is chosen so that the sounds are more alike he will not follow the command.

It must be borne in mind, too, that there frequently is a diminution of sensation in the affected arm in some spastics so that although the motor defect may be almost entirely corrected, nevertheless, the child will not use the arm. The sensation is much the same when a heavy woolen glove is worn. A pinprick or hot and cold can be felt, but not a shoestring or the difference between smooth and rough. Therefore, in training such arms it is very essential to bear in mind this possibility and to depend on training in eye-to-hand coordination.

Thus, cerebral palsy represents sensory handicaps involving sight, hearing and sensation, as well as motor handicaps of the arms, legs, speech and appearance. All of these must be carefully evaluated before subjecting the child to either an intelligence test or a determination of his potential abilities.

Physical Therapy in General Practice

H. S. Hoffman, M.D.

It should be made clear at once that this title does not mean the use of physical agents by the general practitioner alone; rather it is intended to imply their use by all classes of practitioners—general practitioners, internists, otolaryngologists, pediatricians, and so forth—as distinguished from those who specialize in the practice of physical therapy exclusively. This separation is made on the basis of training and understanding of the subject. Manifestly, the physician who specializes in this field is familiar with the whole subject. Opposed to this relatively small but ever-increasing group is the large number of physicians who have little or no understanding of the nature of physical therapy treatment, particularly those methods associated with electrical, thermal and actinic phenomena. Too many in this group are in the same class with the laymen who refer vaguely to "light treatments". Yet in this class of medical men lies the greatest opportunity for the use of physical agents. Obviously, the number of patients treated by the physical therapist is not significant as compared to those seen by all other types of practitioners.

In between these two groups lies another more indefinite class—those who by reason of their specialty have a fairly comprehensive grasp of the general field or an intensive knowledge of one or two modalities. The orthopedic surgeon stands at one end of the scale with a good working knowledge of physical measures. At the other end may be placed such specialists as the psychiatrist with his hydrotherapy, the gynecologist with his frequency machine, and so forth. For our purposes we can place the orthopedic surgeon in the group of physical therapists. He usually is quite well versed in the application of physical therapy. But what of the rest?

In physical therapy many diverse physical agents are used. These may include water, heat, visible and invisible light, x-rays, radium, air, vibration, massage, passive and active exercise, and electricity in any of several forms. The method to be used, therefore, may be chosen from many. The rationale for the use of these procedures is fairly well established in some instances and in others we still stroll with more or less nonchalance on the "path of empiricism". On the whole, however, it is safe to say that where rationalization has occurred we are on firmer ground than in other forms of therapeutics. Indeed, it is a great relief to have arrived at a point where the many observable effects of physical methods are not immediately blamed on psychological reactions by the profession generally. It is no great feat of memory to recall the time when the mere suggestion of physical modalities other than massage and heat provoked sceptical smiles. Today this is no longer true, although to many practitioners of medicine there is still something slightly mysterious about the phenomena of radiation and electricity. For some reason, the association of the laws of physics with the biological reactions of tissue seems too remote and incongruous for the average physician to accept.

The inclusion of physical therapy in the curricula of many—if not all—"Class A" medical schools has resulted in a slowly increasing group of recent graduates who have a more or less adequate insight into the subject. It is not untimely, therefore, to scan the field of physical therapy in the general practice of medicine.

The problem of general therapy divides itself naturally into certain groups—some of which have substantially sharp limitations while others are rather ill-defined. First and foremost is therapy incident to that group of pathological conditions in which there is present known etiological agents or morbid processes. Here we deal with more or less definite indications in many instances—but not always, because in the group of diseases of known causes are a number in which specific treatment is not available. The well known association of quinine and malaria, arsenic and spirocheta! diseases, chalmoogra oil and leprosy is familiar enough, but what of specific treatment in tuberculosis or typhoid?

1718 Rhode Island Avenue, N. W., Washington, D. C.
Read before the District of Columbia Chapter of the American Physiotherapy Association, November 12, 1940.

Even in the instance of known specific treatment for conditions of known cause other nonspecific treatment may not only be helpful and advisable, but necessary. In the larger group of disease processes without known causes, there is again a subdivision into some that may be considered to have a specific treatment and others in which treatment is termed symtomatic, supportive, expectant, et cetera.

Physical therapy finds itself consigned to these same categories. It may be employed, therefore, in the following situations: (1) As a specific treatment in conditions of known etiology. (Ultraviolet in rickets and bone tuberculosis.) (2) As an adjuvant in conditions of known etiology having a specific treatment other than the use of physical agents. (Diathermy, massage, etc., in infectious arthritis.) (3) As an adjuvant in the treatment of diseases of known cause with no known specific treatment. (Physical modalities in infantile paralysis.) (4) As a specific treatment in conditions of unknown etiology. (Hydrotherapy, massage, etc., in spastic muscles of undetermined origin.) (5) As an adjuvant in conditions of unknown etiology with known specific treatments other than physical agents. (6) As an adjuvant in conditions of unknown etiology without known specific treatment. (Electricity, massage, passive exercise, etc., in multiple sclerosis.)

From the above classification it is obvious that physical agents have a surprisingly extensive use in the general practice of medicine. It is apparent that if the full range of physical therapy was suddenly no longer available our modern system of therapeutics would be seriously dislocated. It is equally apparent that time and space does not permit us to discuss in detail the many valuable applications of physical agents. We must content ourselves with a discussion of some general ideas. Even a partial list of specific conditions in which physical therapy may be used effectively is interesting:

Abdominal contusions	Anorexia nervosa
Acrodynia	Appendicitis
Addison's disease	Arthralga
Alcoholism	Ascites
Anemia	Ataxia
Ankylosis	Acne
Apoplexy	Acute rhinitis
Arteriosclerosis	Adhesions
Articular rheumatism	Amyotonia congenita
Asthma	Angina pectoris
Abscesses	Aphonia
Acroparesthesia	Arterial spasm
Adenitis	Arthritis
Amenorrhea	Asthenia
Aneurism	Autointoxication

The above list of conditions in which physical therapy procedures have been recommended was taken from the general index of a standard work in medicine. It includes those in the "A's" only. It gives some indication, however, of the broad application of these methods.

Just how much training should a practitioner other than a physical therapist have to be qualified to use the modalities available? Naturally, any physician should be thoroughly conversant with indications and contraindications for the use of heat. He does not need special training to learn how and when and where to use a hot water bottle or an electric pad, or a hot wet compress. Nor should a competent physician have to hesitate on the indications for exercise. On the other hand, relatively few physicians in general practice know much about massage, diathermy or electrical currents. Undoubtedly, it is essential for general practitioners to have had an adequate course in the theory and practice of physical therapy to fit them to make the most of these procedures. This does not mean that they must become expert in the handling of equipment or the actual giving of treatments. But they must know the underlying principles of the various modalities and their practical applications. As to the actual carrying out of the treatment he must either learn the mechanics of doing so himself or he must employ one who has had proper training.

It is perfectly possible to give every medical student a course in the theory and practice of physical therapy. Many of them are receiving such training today. Men who graduated before such courses were given in the medical schools usually can get its equivalent. Those in large centers will find, upon investigation, that such courses are being given and are available to them. In other districts postgraduate work may be arranged through the county medical societies. But this does not qualify physicians to give all forms of treatment. It is true that with a good working knowledge of the physics and physiology of ultraviolet rays an intelligent individual can learn to operate an ultraviolet lamp efficiently in a few hours. Neither should it take him long to learn how properly to operate a short wave machine. But it is equally true that it would

take him quite a while to learn how properly to massage a part of the body. A short course in or out of school merely serves to give an individual an introduction to the field of physical therapy. It cannot do more than give him an idea of the general indications and possibilities. But it can very well be used as a basis for continued study and application while practicing.

The specialist has an easier problem. In the first place, the use of physical agents in his specialty is much more limited than in general practice. His field being a limited one it automatically restricts his therapeutic measures of all types and particularly physical therapy. Secondly, in his postgraduate training which he has taken in order to qualify as a specialist—whether he be pediatrician, otolaryngologist, oculist, gastro-enterologist—he will be taught very thoroughly the therapeutics used in his field including, of course, physical therapy. A dermatologist may use an ultraviolet lamp or an x-ray machine. It is easy for him to become expert in the use of this limited form of treatment. In fact, he may be quite as efficient as a physical therapist in this narrow scope.

We come now to the idea of equipment. How much is necessary; how much is desirable? The specialist rarely requires more than one or two pieces of equipment. A pediatrician can find much use for an ultraviolet lamp but ordinarily has little opportunity to use anything else. An internist can effectively use a high frequency machine—short or long wave—in treating many of his patients; also an ultraviolet lamp to some extent. For the general practitioner a great deal of equipment is neither necessary nor desirable. It is really surprising how much physical therapy can be applied with a few intelligently selected pieces of apparatus. In general practice, few offices need more than an ultraviolet light, a high frequency machine, a source of galvanic and faradic current and an infra-red lamp. This collection of equipment is quite enough. It certainly need not be very costly.

Learning the technic of giving treatments and selecting equipment, however, is not the most difficult part of the problem. Granted that a physician does learn it, he is faced with the "time" factor. There is hardly a procedure in physical therapy that takes less than 20 to 30 minutes to carry out, which means that a physician who personally gives treatments cannot see many patients during an "office hour" period.

Either the general practitioner or specialist who gives his patient the benefit of physical therapy is forced sooner or later to turn over to an office assistant the actual work. As a general rule his success with this type of work depends in great measure on the type of assistance he uses. Until quite recently a physician in securing an office helper had to choose either one trained for a business office—one who was essentially a secretary—or a trained nurse. Occasionally a nurse who can take notes in shorthand and type is available. The fact that more of the secretarial type are employed would indicate that in the average office there are no nursing duties required that a secretary with average intelligence cannot learn readily. It would appear, therefore, that a physician who had any idea of using physical therapy would be wise in seeking for an office assistant a trained therapy aide instead of either a nurse or a secretary. A trained aide could do all the treatment with only general supervision and at the same time could be depended upon to learn what little nursing was necessary far more easily than a person trained in a business office.

All of which brings us to the following conclusions: (1) Physical therapy has an extremely broad and important place in the general practice of medicine. (2) Specialists having need for physical agents in a very limited way usually find it practical to give such form of treatment in their own offices. (3) General practitioners who wish to use physical methods in any substantial degree may do so without the expenditure of large sums of money for equipment, but they must have had some formal training in the basic principles of the subject and must be prepared, sooner or later, to hire as an assistant a trained physical therapy technician.

The Results of Cooperative Fever Therapy Research

Murray B. Ferderber, M.D.

The use of heat as a therapeutic agent is as old as the art of medicine and assumes many forms which our modern concepts have placed in categories for specific treatment. The baths of the Egyptians, Romans, Japanese, the spas of Europe and this country were primarily intended as forms of fever therapy, but the present day concept has so modernized therapeutics that any or all of these methods may be used in our local hospitals.

Wagner-Jauregg is credited with the first attempt to utilize a bacterial agent to induce hyperpyrexia in the treatment of syphilis of the central nervous system. From this discovery have arisen the many present day methods including such modalities as radiant heat, electrical induction, and more recently saturated atmospheres. It is interesting to note that investigations carried on in Pittsburgh in 1923[1] dealt with the reactions of humans to hot environments intended only as a comfort study but containing all the elements necessary for the production of physiological fevers. In 1929 a local physician subjected a few syphilitic patients to this hot environment and their temperatures were elevated. They were reported as improving greatly and this was probably the first use in this city of air conditioning in producing fever. In the past ten years various methods have been used to elevate temperatures, and like all other ventures the experimental phases were gradually eliminated until we now have reasonably safe methods for this treatment. The desire for a safe, flexible and simple apparatus motivated research which was begun in 1935 by Houghten, Gutberlet and Ferderber.[2] This method of heat production used a simple air conditioning principle of dew-point control which saturates the air at the temperature of the water. Since water is used for moving, heating and saturating the air, it is quite obvious that its simplicity would be conducive to ease of operation. Its safety is based on the entire elimination of burns and shocks; and since the heating medium is water, the simple temperature control permits changing the atmosphere as needed. The use of saturation is based on physical laws of heat transfer and heat loss. Since the body attempts to cool itself by evaporation, prevention of this loss of heat would tend to increase the body temperature, and the presence of moisture would necessitate a lower dry bulb temperature. In other words if dry heat were used, the temperature must be sufficiently high to overcome the heat loss from the body, thus giving rise to the possibilities of skin burns and dehydration. Even in the use of electrical methods, saturation is most important for maintaining body temperature at its optimum with the least amount of discomfort after induction.

The outstanding work of Carpenter, Boak and Warren[3] in determining the thermal death time of the gonococcus has given impetus to the use of mechanical fever for this disease and its complications. Naturally the acute infection responds more readily than the chronic, but work carried on in various centers of this country has demonstrated that many of the sequellae can be eliminated by the judicious use of hyperpyrexia. Sulfanilamide and its derivations combined with induced fever have materially reduced treatment resistant cases, although its use with chronic infections is still questionable. In the treatment of resistant gonorrhea the physician is faced with a very difficult problem, because resistance to fever or sulfanilamide is usually synonymous with resistance to any other form of local or systemic treatment. Therefore, at the present time, excellent results are possible by preceding the fever with sulfanilamide so that at the time of treatment the blood level is approximately 10 milligrams per cent. This is based on the assumption that approximately three-fourths grain of drug per pound of body weight would be sufficient to produce the desired blood level. Starting approximately 18 hours before treatment, about 60 grains are adminstered and about 20 grains every fourth hour through the night. A certain amount of cyanosis may be produced not only by

5722 Fifth Avenue, Pittsburgh, Penna.
Research Fellow in Fever Therapy, Department of Industrial Hygiene, School of Medicine, University of Pittsburgh, Pittsburgh, Penna.

the drug but perhaps by the combined treatment. Usually the fever is maintained for 10 hours with the body temperature approximately 106.5 F. which would correspond to the average thermal death time of the gonococcal organism. Supportive and symptomatic measures are carefully followed during this long session, and examination of records of other clinics would indicate that it is a reasonably safe procedure.

Both here and elsewhere mechanical fever is gaining great headway in the treatment of syphilitic infections with or without the addition of chemotherapy. Except for optic atrophy and severe deterioration we have been able to produce improvement in a satisfactory number of cases. Up to the present time the treatment of this disease consumed from one and a half years upward without reducing the periods of transmission, thereby promoting the spread of infection. It has been the hope of workers to prevent its spread and shorten the treatment periods. Indications point very strongly to these two accomplishments:

1. Massive doses of chemotherapy by the intravenous drip method[4], and
2. Combined use of fever and chemotherapy[5,6].

The first is based on the intravenous administration of an arsenical derivative for five days, except at night when rest must be obtained. It is interesting to note that those patients, who were observed for long periods following this method, became serologically negative in about three months. The best results were obtained in the dark field positive but serologically negative cases. The second method varies greatly in that combined with the drug, twelve treatments of fever from three to three and one-half hours each are given once or twice weekly. A bismuth preparation is injected intramuscularly in the morning preceding treatment and at the height of the produced fever the arsenical is administered. This short session makes possible the ambulatory management of cases, and negative serology is produced in approximately 80 to 90 days. From all available reports not a single case of blindness due to either method of treatment has occurred. This is due not only to improvement in technique but especially to the reduction of toxicity and an apparent increase in the potency of the antiluetic drugs.[7] From a comparative study of the two methods the combined therapy has several advantages:

1. All types of luetics receive this same form of treatment with splendid results.
2. The fear of excessive amounts of drug in a short period may be allayed although there is some question whether the proper antiluetic chemical is harmful in large doses.
3. The additional benefit in treatment resistant cases is unquestionably very important from an economic as well as a social standpoint. Because of the great interest in the syphilis problem by the Federal and local governments, it becomes obvious that fever therapy will play a much greater part in the treatment of syphilis than ever before.

The treatment of nonspecific arthritis is very controversial; and despite the increase in improvement index of such cases, it will be necessary to know more concerning the etiology before the use of fever therapy becomes standardized for such diseases. Except for the so-called "infectious" type of arthritis, one may question the wide use of fever therapy, but this particular infection is quite common and our results are surprisingly good when the patient is seen reasonably early in the course of disease. Whether it is the specificity of fever or the stimulation of the factors of resistance is unknown, but we have observed that improvement is very marked. The degenerative types of arthritis receive only temporary relief, and it is our opinion that such measures are symptomatic and not specific.

The treatment of the chorea-rheumatic heart disease cycle has been greatly improved by the addition of induced fever which in many cases prevents the harmful complications which frequently follow[8,9]. Since this ailment chiefly affects children, it is all important that we strive to prevent those cardiac complications which make invalids and greatly shorten the lives of many patients. Early intensive treatment will produce subsidence of choreic symptoms and with pleasant, quiet surroundings after a course of fever, symptoms frequently disappear entirely and do not recur with the same rapidity that we have encountered in the past. However, there is a group of rheumatic children who are bedridden with cardiac complications and low grade infections who deserve special mention. Through the interest of one of our cooperating institutions, we have been able to treat such a group of children with surprisingly good results even though they have been hospitalized for many months. These patients have shown an increase in weight, strength and well being, and many are now attending special schools designed for such persons.

While it is true that they may never be free from their cardiac complications, yet the normalcy of their existence will go far in restoring some degree of selfsufficiency.

Although there are many other individual ailments which have responded to fever therapy, these are by far in the minority and the groups just mentioned cover the present field rather completely.

Any research program to be useful must produce certain results other than the therapeutic effects themselves. The Fever Therapy Research Study of the University of Pittsburgh has materially aided the concept of the relationship between body reaction to disease and the effects of the environment in which we live. For example, the acute case responds more readily to treatment because the body is attempting to defend itself by means of an increased temperature and white cell count reaction. The farther removed from the acute stage, the more difficult becomes the treatment of any illness. The reason for this has been rather vague, but we feel that the daily rise and fall of body temperature during the period of infection produces the same rise and fall in white count response. Is it not reasonable, therefore, to assume that a state of exhaustion or fatigue of the defense mechanism may be the factor behind the reason for little or no improvement in chronic illnesses? In a previous report[10] we were able to show that the amount of improvement was directly proportional to the increase of the white cell count after treatment. Since this holds true for approximately 300 cases, the possibility of error becomes less because of our large series. This same exhaustion or fatigue may occur during the course of fever treatments when the body becomes resistant to induced heat and does not permit either the temperature or the white count responses that are desirable. This occurrence may give rise to the use of single, long fever periods which would, therefore, eliminate the above complication. However, where temperature elevation becomes very difficult, when fever is given at short intervals, treatment is discontinued temporarily and resumed with the usual response on the part of the body.

A very important outgrowth of fever therapy research has been the knowledge of what takes place when humans are exposed to high temperatures either in occupation or locally but without therapeutic purposes. In some investigations carried on recently[11] the exposure of young, healthy, male adults to hot environments produced temperature and white cell rises similar to those found in fever therapy. These subjects were engaged in carrying out certain manual procedures resulting in the deduction that exposure to hot environments could produce certain physiological changes. Since this conclusion was based on original findings in fever treated patients, our research study has been invaluable since we have extended it beyond the scope of actual medical procedures. Whether constant exposures to such conditions might produce a state of exhaustion or fatigue of the defense mechanism remains to be seen and only adds to the future possibilities of studying body and environmental temperature.

Since saturated heat was the medium for raising body temperatures, investigations were begun to determine whether the application of moist heat could be used for treating portions of the human body. Such an apparatus using the saturated air principle was devised[12] and installed in the cooperating hospitals of the Fever Therapy Research Fund. Experimentally, the efficacy of three methods of heat production, namely, dry or radiant (infra-red), electrically induced (short-wave) and moist heat, were studied. Using anesthetized dogs as laboratory subjects a flow meter was placed between the two femoral veins and each type of heat was applied to one extremity from which the blood flowed. This was devised by Dr. Samuel Soskin[13] of Michael Reese Hospital, Chicago, and consists of a U-tube, one end of which is attached to the distal portion of the ligated femoral vein, and the other end attached to the proximal part of the opposite femoral vein. The veins were ligated opposite the cannula to complete the circulation, and heparin was injected intravenously at frequent intervals to prevent clotting. The rate of flow per unit time was obtained by injecting 0.1 cc. air bubble into the flow meter circuit and measuring with an accurate stop-watch the time required for the bubble to pass between two definite marks at each end of the U-tube. Instead of the injected bubble passing into the circulation of the animal, it was permitted to escape following its circuit upwards into an inverted bottle filled with physiological saline and heparin which displaced the air with the required fluid. This procedure prevented the possibility of an air embolus lodging at any point in the circulation. Kymographic readings were continuously recorded, and respiratory and pulse rates were ac-

curately tabulated. Each type of heat was separately applied to the limb cannulated at the femoral vein distally, the deep muscle temperature and the rate of flow recorded at specified intervals. Before a succeeding type of heat was applied, the blood flow and temperature were permitted to return to normal in order that all factors be kept constant. From this study we concluded that:

1. Short-wave produced the most rapid rise in deep muscle temperature between 107-109 F.
2. Infra-red produced little or no deep temperature because of the poor thermal conductivity of human tissues.
3. Moist heat produced deep muscle temperatures between 105-107 F. in a longer period than short-wave, but the rate of blood flow per unit time was greater than either of the other two methods used.

This would indicate that moist heat in this particular form should bring about a greater therapeutic effect since heat is used only to produce hyperemia in the affected tissue. In many of our cooperating hospitals extremities are being treated with this modality and the results are excellent. In industry where the same types of injuries occur, this method of heat induction has proved very satisfactory. It is definitely known that heat should be applied sufficiently long to produce certain physiological changes, most important of which is increased blood supply. It is a fallacy, therefore, to use heat for short periods varying from ten to thirty minutes since a certain amount of time must be consumed to produce changes which lead to hyperemia. Our animal experimentation and certainly our clinical experience have definitely indicated that the exposure to heat of any portion of the body must be sufficiently long to produce desired increases in blood supply. Instead of the customary fifteen to thirty minute treatment periods, we advocate one and one-half to three hours for each session so that not only will the effects be greater but the beneficial changes will be prolonged for a longer period.

The common fracture frequently results in stiffness of tendons and the joint itself, and convalescence is drawn out and recovery is, therefore, retarded. In considering such cases our index of improvement has been extremely high and less than 10 per cent fail to improve, which means that return to former occupation must be used as an index of improvement. The simple sprain is a very common type of injury in everyday as well as industrial life. The judicious use of moist heat for a two or three hour period will permit a return to almost complete function in a short period as our records show. In one of our cooperating institutions a series of nine varicose ulcers were treated resulting in eight complete recoveries none of whom have returned for additional treatment which would indicate to us that sloughing had not occurred at the time of this report. Bursitis, except where calcification is extensive, responds very satisfactorily to the use of moist heat, and this would be of extreme value to those individuals whose activities, like athletes, are fairly constant. The last group of cases are those suffering from some form of vascular deficiency such as arteriosclerosis and thrombo-angiitis obliterans. Many cases have been treated routinely in the associated hospitals, and the symptomatic results are very encouraging. However, since these observations are based on subjective findings only, we could scarcely state the exact physiological effects that might be produced. Especially in the arteriosclerotic the relief of rest and walking pains and the disappearance of cyanosis would lead us to believe that we have a valuable adjunct to the other treatments that are already standardized. We have no desire to advocate our method as a therapeutic procedure in the treatment of vascular diseases until a thorough investigation is made to determine its value. However, with such encouraging reports we feel that a careful and scientific study should be made.

There are many so-called "back injuries" where bony pathology does not occur, but which cause not only severe pain but frequently extensive disability. We have designed a unit for the treatment of the back from the cervical to the gluteal regions including the shoulders and hips. Any or all of this area may be treated at one time by an apparatus which is identical in principle to the other machines discussed. At the present time it is too early to evaluate the effectiveness of this treatment since insufficient units are in operation.

The use of instruments for the measurement of skin temperatures is confusing because such values are purely relative and not specific. It is difficult to design a simple temperature measuring apparatus, but thirty years ago Stewart[14] devised calorimetric vessels for the measurement of heat transfer from an extremity to water of known weight, volume and temperature. Using these factors we have designed containers by

which it is possible to measure the therapeutic effects of heating modalities. This would be especially valuable in peripheral vascular diseases since our instruments are very inefficient under the most ideal conditions which are rarely obtained.

The study of temperature control in the body is most fascinating but involves so many variables that very few set rules are possible. Although the original work of Wagner-Jauregg has been modified little but followed rather completely in the treatment of syphilis, a report soon to be published covering approximately nine years of investigation of fever therapy research indicates very strongly that the careful use of controlled fever with the proper chemicals will in a great measure reduce the tremendous losses from syphilis. Many of the leaders in medicine have been consulted and an impartial survey will reveal how valuable fever therapy has become in the treatment of the venereal diseases. Like all evolutions we have passed through a period of change which has been productive of more specific knowledge of physiological activity under varied circumstances. With improvement in drugs, machinery and serology tests, we are now in a position to attack the problem of syphilis control and eradication in this country.

SUMMARY

1. We have attempted to show that the use of systemic fever has progressed to the point where not only mechanical efficiency but the safety of the patient has been definite.
2. The technique of combined chemical and fever therapy has produced excellent results in the treatment of the venereal diseases.
3. Animal experimentation has shown that the properly selected heat will produce greater physiological changes.
4. The therapeutic use of local heat production has been established in the hospitals associated with this study.
5. A system of measuring the efficiency of heat in the extremity is demonstrated as an accurate measure of heat transfer.

BIBLIOGRAPHY

1. McConnell, W. J., and Houghton, F. C.: Some Physiological Reactions to High Temperatures and Humidities. Trans. Am. Soc. Heat. & Ventil. Engin., 29:131-163, 1923.
2. Houghten, F. C., Ferderber, M. B., and Gutberlet, Carl: Fever Therapy Induced by Conditioned Air, Trans. Am. Soc. Heat. and Ventil. Engin., January 1937.
3. Carpenter, C. M., Boak, R. A., Mucci, L. A., and Warren, S. L.: The Thermal Death Time of Neisseria Gonorrhea in Vitro With Special Reference to Fever Temperatures. J. Lab. & Clin. Med., 18:981, 1933.
4. Hyman, H. T., Chargin, L., Rice, J. L., and Leifer, Williams: Massive Dose Chemotherapy of Early Syphilis by the Intravenous Drip Method. J.A.M.A., 113:1208-1214, Sept. 23, 1939.
5. Kendell, H. W., Rose, D. L., and Simpson, W. M.: Fever Therapy Technic in Syphilis and Gonococcic Infections. Arch. P. T., 20:614-619, October 1939.
6. Bennett, A. E., Nielsen, J. C., Fechner, A. H., and Cash, P. T.: Combined Artificial Fever and Chemotherapy in Dementia Paralytica, Arch. P. T., 20:620-627, October 1939.
7. Tatum and Cooper: An Experimental Study of Mapharsen (meta-amino-para-hydroxphenyl arsenoxide) as an Antisyphilitic Agent. J. Pharmacol. and Exper. Therapy, 50:198, February 1934.
8. Ferderber, M. B.: Use of Fever Therapy with Children. Penna. Med. J., 41:354-357, February 1938.
9. Sutton, Lucy P., and Dodge, K. G.: Fever Therapy in Chorea and in Rheumatic Carditis with and without Chorea. J. Lab. & Clin. Med., 21:619, March 1936.
10. Report of the First Year of Fever Therapy Research, Department of Industrial Hygiene, School of Medicine, University of Pittsburgh, 1938.
11. Houghton, F. C., Rosenberg, A. A., and Ferderber, M. B.: Seasonal Variations in Reactions to Hot Atmospheres. J. Am. Soc. Heat. & Ventil. Engin., Jan. 1940.
12. Ferderber, M. B.: Saturated Atmosphere in the Treatment of Injuries. Ind. Med., June 1939.
13. Soskin, Samuel; Priest, M. S., and Schultz, W. J.: Influence of Epinephrine Upon Exchange of Sugar Between Blood and Muscle. Amer. J. Physiol., Vol. 108, p. 107, 1934.
14. Stewart, G. N.: Measurement of the Blood Flow in the Hands. Manual of Physiology 218-220, Seventh Edition.

Convention

The Twentieth Annual Convention of the American Physiotherapy Association will be held at Lagunita Court, Stanford University, California, July 13 to 18, 1941, instead of at Asilomar on Monterey Peninsula, California, as originally planned.

Physical Therapy in Disabilities of the Foot

John G. Kuhns, M. D.

Disturbances in the function of the foot are among the most common and most disabling of all ills that come to civilized man. Eighty per cent of all adult persons are said to suffer from some form of foot disorder.[1] In growing children, fifty-eight per cent have been found to suffer from weakness or other disability of the feet.[2] This alarming incidence of abnormalities in feet is partly the result of an unnatural environment —the constant standing and walking on unyielding surfaces. But even in the presence of hard pavements and floors, most of these disabilities are preventable[3] chiefly by teaching proper use and balance of the feet. And after deformity has appeared it often may be corrected. In every case some improvement can be obtained. Crippling resulting from disturbances in the function of the foot is usually a late outcome and is the result of prolonged neglect. Physical therapy is our chief treatment both in the prevention and in the cure of these disabilities of the foot.

These disabilities may result from a great number of causes. The more common causes can be grouped into four categories. Of these, mechanical strains account for at least eighty-five per cent of all disabilities of the foot.[4] Table I outlines the common causes of disabilities. Frequently the disturbance will be the result of more than one cause. One type of disability not infrequently grows into a more serious one with fixed deformity.[5] The recognition of most of these disabilities is not difficult. It is the borderline disturbances, when no serious deformity has taken place, that present the most difficult problem in making a diagnosis and in convincing the patient that treatment is necessary. Here treatment is particularly worthwhile since lasting disability can be prevented and normal function can be regained.

In these borderline cases the most important thing is to measure any deviation from normal function. Much can be learned from hearing the patient's story and by watching the patient walk. Mechanical strain in the posterior part of the foot can be found by determining the weight-bearing line of the foot.[6] This weight-bearing line is a line drawn from the anterior superior spine of the ilium through the middle of the foot. In the foot that is being used without strain this line passes over the foot close to the second toe. In the foot showing strain the line falls to the inner side of the foot, or rarely to the outer side. In children with pronation and abduction of the foot the functional inefficiency also can be measured by determining the angle of pronation, the angle formed by a line drawn through the vertical axis of the os calcis and a line drawn from the midcalf to the heel.[2]

No estimate of mechanical strain can be made from the height of the arch since there are great normal variations in the height of the long arch of the foot. But a depression of the long arch under weight-bearing which can be measured (one-fourth inch or more) indicates strain. The pull of the muscles which balance the foot on the leg, the inverters and everters, can be measured with a spring balance. Normally the inverters should be a little stronger than the everters.[7]

Prints upon paper of the soles and heels of the feet are of value as records and also for estimating early weakness and deformity. Of greater help in determining strain in the forepart of the foot is a study of the relative width and flatness of the foot at the metatarsal area. With this there usually will be an outward deviation of the great toe, "hallux valgus," and dorsiflexion of the proximal phalanges of the other toes, "hammer toes." Calluses under the heads of the metatarsal bones with pain and tenderness in this area are further evidence of strain.[8] Strain and irritation in the gastrocnemius and tendo Achilles are shown by tenderness in this area and over the posterior aspect of the heel, and by the inability to bring the foot beyond a right angle in dorsiflexion when the knee is fully extended.

While the great majority of disabilities of the foot will be the result of mechanical strain, a

372 Marlborough Street, Boston, Massachusetts.

Abstract of talk given before the New England Physiotherapy Association, March 4, 1941.

small number will occur from other causes. Infections will show local heat, redness, tenderness and muscular spasm just as infections in other parts of the limb. Deformities will show changes from the normal contour in various parts of the foot. Circulatory disturbances in the lower extremity, while very distressing, are rare as causes of disability in the foot. The circulation of the foot is commonly tested by the warmth of the skin of the foot in comparison with the cutaneous temperature in other parts of the body and by palpation of the dorsalis pedis and posterior tibial arteries. A more accurate method is to observe the amount of blanching when the limb is elevated for one minute and the speed with which redness appears when the limb is lowered.[9]

More important than the recognition of gross disturbances in the foot is the recognition of what is normal in order that the lesser deviations may receive early and adequate treatment. A definition of a functionally normal foot is given in Table II. In this examination of the foot the general posture of the patient must not be forgotten for it has very important effects upon the function of the feet.[10] With faulty posture and increased forward inclination of the pelvis the center of gravity is shifted farther forward. To bring the support of the legs under this changed weight-thrust there is an internal rotation in the femoral columns. Since no rotation is possible at the knee and ankle joints this internal rotation takes place at the posterior tarsal joints and results in valgus at the heel and prominence on the inner side of the foot. With faulty posture also there usually is flexion or hyperextension of the knees and relaxation of the supporting structures about the ankle.

In the treatment of the usual disabilities of the foot there are three things that must be considered: (1) the way the foot is used in standing and walking, (2) the posture of the whole body, and (3) the shoe that is worn habitually. The correction of faulty balance and other wrong uses of the foot and the improvement of the posture of the patient are secured chiefly through exercises and other forms of physical therapy. The kinds of physical therapy commonly used are given in Table III. Treatment will differ somewhat in children and in adults.

CHILDREN'S FEET

The common disability seen in the feet of children is weakness with pronation and abduction. Here the problem is one of teaching proper carriage of the body and the use of the feet in a good weight-bearing position. Through example and by exercises, good posture and better coordination and strength are secured. What is sought is proper balance of the whole body of which the feet are only a part. Occasionally rest and fixation of the feet are necessary temporarily. Manipulations and surgery are required at times. But serious deformities of the feet are rare in childhood. Symptoms referred to the feet also are rare. Here our problem is more one of prevention of disability. In this prevention of disability while the teaching of proper balance is most important, proper shoes also must be worn. The best type of shoe is a well fitting oxford with a firm leather sole (Table IV). If there is much valgus of the os calcis, a raise of one-eighth inch is put under the front inner corner of the heel. If the long arch of the foot is much depressed a pad of rubber or felt may be put under the arch. Any apparatus used to support the feet of children is for temporary aid only and is taken away as soon as the foot can be held in good balance and without strain by the supporting muscles.

ADULT FEET

In the feet of adults one rarely finds weak feet alone. By this time, through faulty use, bad shoes and incidental diseases, deformities will have developed. The more common of these deformities will be: (1) A rigid valgus with abduction of the foot and lowering of the midfoot. (2) Spread of the forepart of the foot with adduction of the great toe (hallux valgus) and hammer-toe deformity in the other toes. (3) Contracture of the tendo Achilles. All of these deformities are correctable entirely or in part, and symptoms are relieved. With proper shoes and with exercises and with occasional temporary support good function again can be obtained. If there are acute symptoms with pain, swelling and muscular spasm, rest may be necessary temporarily. Muscular spasm subsides more quickly if the foot is held with a plaster cast in a position as close to the normal weight-bearing one as can be obtained. Symptoms will subside more quickly if heat is applied to the feet for twenty to thirty minutes three times a day. Massage, given not too vigorously, with avoidance of tender areas is helpful in the aged and debilitated. As soon as exercises can be performed without pain they are taught first without weight-bearing and later with weight-bearing. These are of the same kind as are given for children. The aim here also is im-

proved posture and better balance and weight carriage on the feet. When there are contractures or resistant deformity, assisted exercises are helpful. Here the patient tries to make corrective movement with his own muscles and is assisted in doing so by the hand of the physical therapy technician. Where this fails to correct deformity, manipulative or operative procedures must be considered. After operations or manipulations, exercises are again given to secure as much muscular power and functions as can be obtained. Apparatus also is discarded as soon as the foot can be held in good alignment without it, except in the aged or in paralyzed individuals.

Infections become the concern of the physical therapist after the acute stage of the disease is passed. Much can be done during the acute stage, under supervision, by rest of the foot in elevation and fixation in a good weight-bearing position, by heat and occasionally by roentgentherapy. In the aftercare of the patient, function must be regained chiefly through exercises.

Disability of the foot resulting from circulatory insufficiency can be helped greatly by physical therapy measures. Temporary improvement in the circulation can be expected by the use of intermittant suction and pressure with the use of special apparatus. Exercises are usually the most effective form of treatment. Here the exercises may be passive as in the Buerger's exercises. Massage also may be used to accelerate the flow of venous blood. In our experience the most lasting improvement has followed the performance of active exercises for the involved extremity, associated with diaphragmatic exercises. For the milder circulatory disturbances contrast baths of hot and cold water are helpful. In the severe circulatory changes surgical intervention may be required. In addition well fitting shoes and apparatus to keep the feet in good alignment until the muscles become strong are usually necessary.

In the treatment of painful heels whether they are associated with spurs at the attachment of the plantar fascia or with periostitis about the margins of the heel, surgery is rarely if ever necessary. Physical therapy in the form of heat, diathermy or roentgentherapy with the temporary use of support to keep the foot in good balance and avoid strain usually will relieve symptoms. Later exercises are given to develop proper function of the foot and in this way prevent a recurrence of symptoms.

Plantar warts will sometimes disappear when proper foot balance has been obtained and there are no localized areas of excessive pressure. They are always superficial and never penetrate the deep layers of the skin. For the persistant ones roentgentherapy or high frequency is the treatment of choice.

"Ingrown toe nail" is a misnomer. The toe nail does not grow into the skin. The skin is pushed up over the edge of the nail either by tight shoes and stockings or from faulty weight-thrust—a spreading and medial rotation of the great toe. Ingrown toe nails frequently disappear without local treatment if the faulty carriage of weight on the toes is corrected and if properly fitting shoes and stockings are worn.

Corns and calluses are caused by excessive pressure, usually intermittant, on the skin of the foot. They are Nature's protection against slight repeated trauma to a local area of the skin. They may be relieved temporarily by local padding. They will disappear completely only when the undue pressure is removed. They are more common in the forepart of the foot when there is spreading of the forefoot with halux valgus and hammer-toe deformity. They are chiefly the result of improper balance and carriage of weight upon the feet. The correction of these by exercises and the wearing of good shoes will relieve the condition entirely.

Mycotic infections, so common about the toes of the feet and popularly misnamed "athlete's foot," occur only when there is an unusual amount of moisture of the foot, usually venous congestion and excessive sweating. The fungi which invade the skin of the foot require a moist surface on which to grow. It has been shown that if this moist condition of the skin is partially relieved by avoidance of strain through exercises and foot-supports the fungi will disappear for the most part. Until this does occur, the infection can be relieved by fungicides, by iontophoresis and by roentgentherapy.

SUMMARY

Disabilities of the feet are extremely common both in children and in adults. Mechanical strain accounts for most of these disabilities. These disabilities often are preventable, particularly by early training in proper use of the feet. In addition the posture of the patient must be corrected and proper shoes must be worn. Physical therapy is of great help in decreasing deformity and preserving function in all of these disabilities.

TABLE I

Usual Causes of Disability in the Foot

I. ***Mechanical strain***

A. Acute trauma
   1. To bones
   2. To soft parts
B. Chronic strain
   1. Weak feet—valgus and pronation
   2. Spreading of forefoot
   3. Poor posture
   4. Bursitis

II. *Fixed Deformities*
A. Congenital
   1. Involving the foot
      a. Clubfoot
      b. Congenital flatfoot
      c. Short second metatarsal
   2. Involving the lower leg
B. Acquired
   1. Following injury
   2. Following disease
   3. Developmental
      a. Long continued faulty use
      b. Epiphyseal lesions
C. Tumors

III. *Infections*
A. In bones and joints
   1. Acute—osteomyelitis
   2. Chronic—arthritis
B. In soft parts
   1. Cellulitis
   2. Phlebitis
   3. Mycotic infections

IV. *Circulatory disturbances*
A. Intermittant
   1. Tight clothing
   2. Vasospasm from other causes
   3. Reynaud's disease
B. Constant
   1. Arteriosclerosis
      a. Senile
      b. Diabetis
   2. Buerger's disease
   3. Varicose veins

V. *Miscellaneous conditions*
A. Painful heel
   1. Spurs
   2. Periostitis
B. Plantar warts
C. Disturbances about nails
   1. Ingrown toe nail
   2. Paronychia
   3. Thickening of nail
D. Corns and calluses

TABLE II

Requirements of a normal foot

1. A normal weight-bearing line.
2. No obvious deformity.
3. No corns or localized calluses.
4. The usual range of active motion at the ankle joint, posterior tarsal joints and at the toes.
5. No swelling about the ankle or over the dorsum of the foot.
6. The foot should have the same warmth as the lower leg and there should be pulsation in the palpable arteries.
7. No cracks between the toes or other evidence of a mycotic infection.

TABLE III

Physical therapy commonly used in foot disabilities.

1. *Rest*
   A. Simple—non-weight bearing
   B. With fixed positions
      1. Cast
      2. Strapping
      3. Bandage
   C. Elevation
      1. Constant
      2. Intermittant
2. *Exercises*
   A. Local
      1. Active } with and without weight-bearing
      2. Assisted }
         a. With stretching apparatus
   B. General
      1. Postural
3. *Massage*
   A. With rest and exercises
   B. To improve local circulation
4. *Heat*
   A. Radiant
   B. Conducted (dry or moist)
      1. Foot baths
   C. Diathermy
5. *Other Forms*
   A. Galvanic and faradic stimulation
   B. Roentgen therapy
      1. In infections and arthritis
   C. Iontophoresis
      1. In mycotic infection

TABLE IV

Criteria of a good shoe.

1. Straight inner line of sole.
2. Sole at least one-half inch longer than great toe.
3. Width of shoe in metatarsal region as wide as foot in weight bearing.
4. Box of shoe high enough to permit motion of toes in shoe.
5. Sole should be of firm leather and shank should be firm.
6. Counter should be high enough so that the arch is not depressed when the shoe is laced.
7. The heel should be low and broad, not more than 1½" for women.
8. The heel of the shoe should be well cupped to fit the surface of the heel and the shoe should fit snugly just above the heel.

REFERENCES

1. Bruce, J.: Management of Flatfoot. Practitioner, 142: 299, 1939.
2. Bivings, L.: Classification of Weak Feet in Children and a Method of Analyzing Foot Prints and Heel Prints. Am. Jour. Dis. Child. 49:1164, 1935.
3. Steindler, A.: Anatomical and Physiological Conditions of the Feet. Military Surgeon, 86:379, 1940.
4. Bankart, A. S. B.: The Treatment of Flatfoot. Brit. Med. Jour. 1:537, 1940.
5. Kuhns, J. G.: Care of the Feet in Chronic Arthritis. J.A.M.A. 109:1108, 1937.
6. Brown, L. T.: A Study of the Foot From an Anatomical and Mechanical Standpoint. Am. Jour. Orth. Surg. 10:18, 1912.
7. Osgood, R. B.: Pathologic and Symptomatic Weight Bearing. A Consideration of the Prevention and Cure of Foot Strain. Am. J. Ortho. Surg., Feb. 1912, p. 416.
8. Lewin, P.: Disturbances of Metatarsal Arch and Aid to Certain Static Foot Conditions. Am. Jour. Surg. 44:305, 1939.
9. Samuels, S. S.: Gangrene Due to Thrombo-angiitis Obliterans. J.A.M.A., 102:436, 1934.
10. Graham, J.: Treatment of Weak Feet. Illinois Med. Jour. 75:425, 1939.

Ethyl Chloride Spray as a Means of Mobilizing Stiff Joints

Lewis Cozen, M. D.

The use of ethyl chloride spray as an aid in relieving the pain of skeletal affections is described by the author elsewhere.[1] Ethyl chloride spray may be used as a local anesthetic to increase joint motion. It may be used in the aftercare of fractures where joint motion is limited following the required period of immobilization. The spray may be used on joints partially ankylosed by hypertrophic arthritis. In other joint affections its use is still to be determined. Those joints whose synovial membrane is relatively superficial are especially amenable to the use of the spray. The joints of the fingers and the knee joints are in this category.

The technic is simple: The involved joint or joints (as in the fingers) and surrounding tissue are sprayed until the skin blanches slightly. The patient is urged to flex or extend the involved joint, as the case may be, and passive assistance in stretching the joint is rendered by the physician. The spray may be used as often as every second day. It may be employed alternately or in conjunction with accepted physical therapy modalities.

This method of assisted active motion with ethyl chloride locally has been used in six cases. The diagnoses were as follows:

Convalescent fracture-dislocation of ankle joint.

Subdeltoid bursitis with periarthritis of shoulder joint.

Hypertrophic arthritis of metacarpophalangeal joints.

Traumatic arthritis of elbow joint.

The spray was used at weekly intervals for from one to four weeks in these cases. Two of the patients received heat and massage in addition to the ethyl chloride stretching. All but one of the six cases developed an increased range of motion which seemed related to the ethyl chloride mobilization.

This method of mobilizing stiff joints would seem especially useful where a physical therapist is not available to supply repeated baking, massage and assisted active motion. The method described takes little time and is not expensive.

Ethyl chloride, in addition to its analgesic effect, tends to relax muscle spasm. As a counter-irritant it produces a reflex hyperemia which also is beneficial.

The injection of novocaine into stiff joints has been advocated by Leriche.[2] Ethyl chloride spray mobilization is advocated as an additional method which is of value in increasing joint motion in selected cases.

1913 Wilshire Boulevard, Los Angeles, Calif.
From the Department of Orthopedic Surgery, College of Medical Evangelists, Los Angeles, Calif.

REFERENCES

1. Cozen, L.: Ethyl Chloride Spray as a Means of Relieving Skeletal Pain, Calif. & Western Medicine, to be published.
2. Leriche, R.: Quoted by Frances Bach. Reports on Chronic Rheumatic Diseases—No. 2—1936, p. 131, The Macmillan Company, New York.

Overheard in a Country Town

A summer guest, recovering from a broken arm, was met by one of the natives, who asked: "Oh, how is your arm, Mrs. White? Has it begun to ignite yet?"—*Reprinted from* THE P. T. REVIEW, *Vol.* 4, *No.* 1, *March* 1924.

Schools for Physical Therapy Technicians

The first list of approved schools for physical therapy technicians appeared in THE JOURNAL, Aug. 29, 1936, following the formulation of the Essentials by the Council on Medical Education and Hospitals and their adoption by the House of Delegates of the American Medical Association.

A more detailed questionnaire was sent to each of the approved schools for physical therapy technicians this year, and returns have been received from all. Today's graduate has had a mean average of twelve months' training in physical therapy in addition to the preliminary training of four years of physical education or three years training in nursing. Five schools will admit students on completion of sixty semester hours of college work. This represents only one-third of the approved schools.

During 1940 there were 135 students who were graduated, while about 140 were in training and expect to be graduated this year. The maximum enrolment, under the present conditions, totals 200 students when one school, that has special classes, is given credit for two groups of students. The tuition for this training ranges from nothing to $400. The mean tuition is $200, while the average is slightly less than that amount.

Schools Approved for Training Physical Therapy Technicians
By the Council on Medical Education and Hospitals

Name and Location of School	Medical Director	Technical Director	Entrance Requirement	Duration of Course	Time of Admission	Maximum Enrolment	Tuition	Certificate, Diploma, Degree
California Hospital, Los Angeles[1a]	Grace P. Jennings, M.D.	Marion D. Campbell, R.N.	(a) R.N. (b) Grad. phys. ed. (c) 2 yrs. coll.	18 mos.	Jan. & July	6	$200	Certificate
Children's Hospital, Los Angeles[2]	John C. Wilson, M.D.	Grace L. Williams, R.N.	(a) R.N. (b) Grad. phys. ed. (c) 2 yrs. coll.	15 mos.	Sept.	14	$150	Diploma
Walter Reed General Hospital, Washington, D. C.[3]	B. A. Strickland, Jr., Capt., M.C.	Emma E. Vogel	Grad. phys. ed.	12 mos.	Sept.	15	None	Certificate
Northwestern University Medical School, Chicago[4a]	John S. Coulter, M.D.	Gertrude Beard, R.N.	(a) R.N. (b) Grad. phys. ed. (c) 3 yrs. coll.	9 mos.	Oct.	12	$200	Certificate
Bouvé-Boston School of Physical Education, Boston[5]	Howard Moore, M.D.	Constance K. Greene	High sch. grad.	3 and 4 yrs.[b]	Sept.	12	$400 yr.	Diploma or B.S.
Harvard Medical School, Boston[6]	Frank R. Ober, M.D.	Janet B. Merrill	(a) R.N. (b) Grad. phys. ed.	9 mos.	Jan. & Sept.	20	$150	Certificate
Boston University, Sargent College of Physical Education, Cambridge, Mass.[7]	To be appointed	Lucille W. Fuller	High sch. grad.	4 yrs.	Oct.	24	c	B.S.
Posse Institute, Kendal Green, Mass.[8]	.....	Lucy G. Marshall	High sch. grad.	3 yrs.	Sept.	15	$400 yr.	Diploma
Mayo Clinic, Rochester, Minn.[9a]	Frank H. Krusen, M.D.	Carl Moe, R.N.	(a) R.N. (b) Grad. phys. ed.	12 mos.	Oct.	20	None	Certificate
St. Louis University School of Nursing, St. Louis[10a]	Alexander J. Kotkis, M.D.	Sister M. Consella, R.N.	High sch. grad.	4 yrs.	Feb. & Sept.	4	$250 yr.	B.S.

Reprinted from the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, March 22, 1941.

University of Buffalo School of Nursing, Buffalo[11a]	George G. Martin, M.D.	Edna Beaver, R.N.	(a) R.N. (b) Grad. phys. ed. (c) 2 yrs. coll.	12 mos.	Jan. & Sept.	10	$375	Certificate
Hospital for Ruptured and Crippled, New York City[12a]	Kristian G. Hansson, M.D.	Ethel M. Willmer	(a) R.N. (b) Grad. phys. ed. (c) 2 yrs. coll.	9 mos.	Sept.	20	$300	Diploma
D. T. Watson School of Physiotherapy (affiliated with University of Pittsburgh School of Medicine), Leetsdale, Pa.[13a]	Jessie Wright, M.D.	Dorothy E. Lovdahl	(a) Grad. phys. ed. (b) 2 yrs. pre-med.	2 yrs.	Sept.	8	None	Diploma or B.S.
College of William and Mary, Richmond, Va.[14]	Thomas Wheeldon, M.D.	Alice Jones	(a) R.N. (b) Coll. grad.	9 mos.	Sept.	10	$200	Certificate or B.S.
University of Wisconsin Medical School, Madison[15a]	Ernst A. Pohle, M.D.	Margaret Kohli and Martha Lewis	(a) R.N. (b) Grad. phys. ed.	12 mos.	July	10	Univ. fees	Certificate

AFFILIATED CLINICAL FACILITIES

1. Glendale Sanitarium and Hospital, Glendale, and Los Angeles County Hospital, Los Angeles.
2. Glendale Sanitarium and Hospital, Glendale, and Cedars of Lebanon Hospital, Hospital of the Good Samaritan, Los Angeles County Hospital, and Presbyterian Hospital—Olmsted Memorial, Los Angeles.
3. Health School for Crippled Children, Washington, D. C.
4. Christopher School for Crippled Children, Michael Reese Hospital, Passavant Memorial Hospital, St. Luke's Hospital, and Shriners Hospital for Crippled Children, Chicago.
5. Boston City Hospital, Children's Hospital, Massachusetts General Hospital, and Robert Breck Brigham Hospital, Boston; Cambridge Hospital, Cambridge; and Newton Hospital, Newton.
6. Children's Hospital, Harvard Infantile Paralysis Commission, Industrial School for Crippled and Deformed Children, Massachusetts General Hospital, Peter Bent Brigham Hospital, and Robert Breck Brigham Hospital, Boston, and Cambridge Hospital, Cambridge.
7. McLean Hospital, Belmont; Industrial School for Crippled and Deformed Children, Massachusetts General Hospital, Massachusetts Memorial Hospital, Massachusetts State Hospital, and Perkins Institute for the Blind, Boston; and Cambridge Hospital, Cambridge.
8. Ring Sanatorium and Hospital, Arlington; Beth Israel Hospital, Boston City Hospital, Carney Hospital, Children's Hospital, Industrial School for Crippled and Deformed Children, Massachusetts General Hospital, and Perkins Institute for the Blind, Boston; and Cambridge City Hospital, Cambridge.
9. Colonial Hospital, and St. Mary's Hospital, Rochester.
10. Firmin Desloge Hospital, St. Louis.
11. Edward J. Meyer Memorial Hospital, and School for Crippled Children, Buffalo.
12. New York Hospital, New York City.
13. Allegheny General Hospital, Children's Hospital, Elizabeth Steel Magee Hospital, Falk Clinic, Industrial Home for Crippled Children, and St. Francis Hospital, Pittsburgh.
14. University of Virginia Hospital, Charlottesville, and Medical College of Virginia Hospital Division, Stuart Circle Hospital, and Wheeldon Clinic, Richmond.
15. State of Wisconsin General Hospital and Wisconsin Orthopedic Hospital for Children, Madison.

FOOTNOTES

a. Male students are admitted.
b. Four-year course leads to B.S. degree from Simmons College.
c. $432 a year for first two years; $265 a year for last two years.

Correlating last year's graduates in physical therapy with the number of medical students graduated annually, a ratio of one physical therapist to thirty-eight physicians is obtained.

The Council on Physical Therapy of the American Medical Association has appointed a committee to study and revise the curriculum and minimum essentials for training schools. It is hoped that these new standards will be ready for publication by next fall.

Inquiries concerning registration should be addressed to the American Registry of Physical Therapy Technicians, 30 North Michigan Avenue, Chicago.

The
Physiotherapy Review

Editor-in-Chief: MILDRED ELSON

Business Manager: HAZEL PUTMAN

Associate Editors

GERTRUDE BEARD
BEULAH BURTNER
BESS SEARLS

The Physiotherapy Review is published bimonthly by The American Physiotherapy Association

Editorial and Business Office,
737 N. Michigan Ave., Chicago

VOL. 21 *May-June* No. 3

A national emergency rarely creates a happy situation. However, this is the case for our National convention. The original plans called for the use of Lagunita Court at Stanford University. This is a beautiful building, surrounding a central patio. It is composed of smaller houses with soft Spanish names, such as Casa Granada, Casa Magnolis and Casa Adelfa. Each casa has its own beautiful living room. There is an excellent room right in the building in which we can hold our sessions.

A year ago we could not secure Lagunita for our conference because the plans for the Fifty Year Celebration at Stanford University were not complete, and no commitments could be made until they were. Consequently our plans were made for Asilomar. We were enthusiastic about them. Everything was going smoothly and then, on April 19th, the Government took over Asilomar for the National Youth Administration.

Your Executive Committee spent a few bad days, but now we have Lagunita Court—our original choice. One of the most beautiful golf courses in the country is on the Stanford campus, and conference guests will have the privilege of its use at student rates. The outdoor swimming pool—directly across from Lagunita—will be open an hour a day to conference guests.

Practically all the rooms are single rooms. There are no private baths available but such facilities are well placed and entirely adequate. There will be but one rate for members—$20.75, and one for nonmembers—$21.75. This will include the registration fee and room and board for five days, beginning with supper Sunday evening, July 13th at five o'clock, and ending with Friday luncheon. The Sunday evening supper will be at the Allied Arts—a beautiful garden spot of this area.

There are to be no extras—no tickets to buy. Your total cost is $20.75 or $21.75. Send your reservations direct to the National office, Stanford University. Please send them early. Everyone can be better cared for if we can plan accurately.

Twentieth Annual Convention

Lagunita Court, Stanford University

The program for the Twentieth Annual Convention is almost complete. We can now tell you the discussion chairman of each group and the consultants. There are still some final arrangements to be made among the discussion leaders for, and topical arrangement of, each discussion group. The complete program will be sent out in a membership letter in the near future.

The program follows:

Sunday, July 13

3:00 P.M. Registration — Lagunita Court, Stanford University

5:00 P.M. Get-acquainted Supper — Allied Arts, Menlo Park

7:30 P.M. Business Meeting—Lagunita Court

Daily, Monday through Thursday, July 14-17

Discussion Groups—all will meet in Lagunita Court

8:30 A.M. **Muscle Testing**
Chairman, Alice Lou Plastridge, of Warm Springs, Georgia
Consultants, Charles H. Danforth, Ph. D., Stanford University; Verne T. Inman, M.D., University of California Hospital

10:10 A.M. **Therapeutic Gymnastics**
Chairman, Catherine Worthingham, of Stanford University
Consultant, Charles L. Lowman, M. D., Orthopaedic Hospital School, Los Angeles
Skeletal Muscle and Motor Activity in Health and Disease
Herman Chor, M.D., Associate, Department of Nervous and Mental Diseases, Northwestern University

12:00 M. Luncheon

1:00 P.M. **Psychology of the Invalid and Handicapped**
Herman Chor, M.D.

2:00 P.M. **Selection and Evaluation of Equipment in Heat Therapy**
Chairman, Hazel Furscott, San Francisco
Consultant, Frances Baker, M.D., University of California Hospital

3:40 to 5:40 P.M. (Monday and Wednesday)
Problems of Crippled Children's Schools
Chairman, Emily Adams, Oakman School, Detroit
Problems of Physical Therapy Schools
Chairman, Susan G. Roen, Orthopaedic Hospital School, Los Angeles

Friday, July 18

8:30 A.M. **Recent Studies in the Treatment of Anterior Poliomyelitis**
Chairman, Sara Kollman, University Hospital, Minneapolis, Minnesota

10:00 A.M. to 12:00 M. Business Meeting

Sport clothes are in order. Be sure to bring your golf clubs, tennis rackets, and such.

The arrangements for the graduate program in physical therapy sponsored by the American Physiotherapy Association through Stanford University have not been changed. May we remind you that registration day is June 23rd at 2:00 P.M., Stanford Medical School, San Francisco? A maximum of six quarter units may be obtained in the month's time. The courses offered are Psychology of the Invalid and the Handicapped, Therapeutic Gymnastics, Advanced Kinesiology, Skeletal Muscle and Motor Activity in Health and Disease, and Study of a Special Problem in Physical Therapy. Details may be obtained by writing Director of Physical Therapy, School of Health, Stanford University.

The Northern California Chapter is looking forward to the privilege of welcoming you and helping to make your stay a pleasant one. The Hospitality Committee suggests the following as but a few of the places you should plan to see in San Francisco and vicinity.

Telegraph Hill, topped by Coit Tower, is surrounded by the artists' colony and Latin quarter. You may go to Fisherman's Wharf for wonderful crab and shrimp cocktails, served right in your car if you like, or to dine at one of the many famous restaurants, such as Joe di Maggio's. The mosquito fishing fleet slips quietly out of the harbor at sunset. If you are an early riser, it's fun to see them come in with their catch in the morning.

Chinatown operates the only Chinese telephone exchange in the United States. There is much of the rare and beautiful art of old China to be seen. The Chinese food markets are an experience.

The Cliff House, with its beautiful restaurant, offers a fine view of Seal Rocks and the Golden Gate. The waves pounding against the rocks are stunning. In fact, at times, they are almost frightening.

Fleishhacher Zoo and the world's largest open air swimming pool lie to the south end of the beach. Golden Gate Park invites you to the de Young Museum, to tea in the Japanese Tea Garden, or to view the beautiful tropical fish at the Steinhart Aquarium. The Palace of the Legion of Honor commands the cliffs toward the blue Pacific.

Both the University of California and Stanford University maintain medical centers in San Francisco.

It is possible to sail under both bridges in a two and one-half hour harbor cruise. A two-hour drive will permit you to stand in the heart of a virgin forest of the world's oldest living wonders —the giant redwoods. This is Muir Woods.

From your conference headquarters at Stanford University (Palo Alto), it is an hour's drive to the Felton Big Trees; a two and a half hour drive to the Monterey peninsula; a five-hour drive to Yosemite; forty minutes to San Francisco.

We are waiting and anxious to show you as many of these things as possible in the time you can stay.

GRACE BENSON, Hospitality Chairman.

The National Foundation for Infantile Paralysis announces the publication of a Spanish translation of the pamphlet "The Nursing Care of Patients with Infantile Paralysis" by Jessie L. Stevenson, R. N., Consultant in Orthopedic Nursing, National Organization for Public Health Nursing. This pamphlet, illustrated by line drawings, was prepared by the National Organization for Public Health Nursing for The National Foundation for Infantile Paralysis as a part of a project in orthopedic nursing sponsored by the Foundation. It is intended to assist the public health nurse and others responsible for home care of patients with infantile paralysis in and following an epidemic. Copies either in Spanish or English are available free upon request from The National Foundation for Infantile Paralysis, 120 Broadway, New York City. Basil O'Connor, President.

The American Academy of Physical Medicine held its Nineteenth Annual Meeting and Scientific Session on April 28, 29 and 30, 1941, in New York City, at the Hotel Pennsylvania, where lectures, symposia, clinical papers, motion pictures, and exhibits were presented. Clinics were held in various medical centers throughout the city.

Tri-State Hospital Assembly

The Illinois, Indiana, Michigan, Western Michigan and Wisconsin Chapters participated in the Twelfth Annual Tri-State Hospital Assembly, May 7, 8 and 9, 1941, at the Stevens Hotel in Chicago, Illinois. The following papers were presented: "Relation of Physical Therapy to Radiology"—S. A. Morton, M. D., Milwaukee; "A Curative Workshop Program with Movies"—Marjorie Taylor, Milwaukee; "Burns"—Harold M. Trusler, M. D., Indianapolis; "Physical Therapy in Army Hospitals"—John S. Coulter, M. D., Chicago; "The Treatment of Pelvic Inflammations with the Newman Thermo-Flo"—Jerome D. Kaufman, M. D., Chicago; "Therapeutic Exercises"—C. O. Molander, M. D., Chicago; "Treatment of Fractures of Hip"—John T. Hodgen, M. D., Grand Rapids; "A Physical Therapy Program in an Orthopedic School"—Mae Prugger, Racine; and "Speech Therapy and Application in Specific Cases"—Inez Marvin, Milwaukee.

Index to Current Literature

Allergy

Allergy in Childhood. LEWIS WEBB HILL. Medical Clarion, Dec. 1940.

Anterior Poliomyelitis

A Study of Paralytic Scoliosis Based on Five Hundred Cases of Poliomyelitis. PAUL C. COLONNA, M.D., and FREDERICK VOM SAAL, M.D. J. Bone and J. Surg., April 1941.

The Orthopedic Aspects of Poliomyelitis. M. FORRESTER-BROWN, M.D. J. Chart. Soc. M. and M. Gym., Feb. 1941.

Amputations

Physical Therapy in Amputations. J.A.M.A., April 5, 1941.

Amputations and Artificial Limbs. A. M. EYRE-BROOK, M. S. J. Chart. Soc. M. and M. Gym., March 1941.

Apparatus

Interrelationships of the Artificial Limb Manufacturer, the Surgeon and the Patient. Council on Physical Therapy, J.A.M.A., April 19, 1941.

A Home-Made Radiant-Heat Cage. J. Chart. Soc. M. and M. Gym., Feb. 1941.

An Elastic Exerciser for Injured Fingers. P. JOBLING. J. Chart. Soc. M. and M. Gym., Feb. 1941.

A Means of Recording Posture. J. Chart. Soc. M. and M. Gym., March 1941.

Amputations and Artificial Limbs. A. M. EYRE-BROOK, M. S. J. Chart. Soc. M. and M. Gym., March 1941.

Arthritis

What Every Occupational Therapist Should Know about Arthritis. EUGENE F. TRAUT, M.D. Occup. Ther. and Rehabil., April 1941.

Bone and Joint Injuries and Diseases

Cysts and Tumors of Bone. A. WILFRED ADAMS. J. Chart. Soc. M. and M. Gym., April 1941.

Serum and Tissue Phosphatase Determinations as an Aid in Evaluating the Radiation Therapy of Bone Tumors. HELEN Q. WOODARD, PH. D., and N. L. HIGINBOTHAM, M. D. J. A. M. A., April 12, 1941.

Treatment of Simple Shoulder Sprains. C. C. COLEMAN, M. D. Brit. J. Phys. Med., Jan. 1941.

Congenital Dislocation of the Hip. FREMONT A. CHANDLER, M. D. Public Health Nurs., Mar. 1941.

Friedlander Bacillus Osteomyelitis. ISIDOR S. TUNICK, M.D., and JOSEPH R. STONE, M.D. Bull. Hospital for Joint Dis., April 1941.

Cardiac Conditions

Cardiovascular and Systemic Morbidity Following Hyperpyrexia in Central Nervous System: Syphilis. ALAN A. LIEBERMAN, M.D., CHARLES J. KATZ, M.D. Illinois Med. J., Feb. 1941.

Public Health Aspects of Heart Disease in Children. PAUL S. BARRETT. J. Health and Phys. Educ., Mar. 1941.

Heart Disease in the Adult. MELVILLE A. GOLDSMITH, M.D. Public Health Nurs., April 1941.

Diathermy

Use of Short Wave Diathermy in the Study of Peripheral Vasospasm. MAURICE HARDGROVE, M.D. and S. A. MORTON, M.D. Wisc. Med. J., Feb. 1941.

Short Wave Diathermy Power Absorption and Deep Tissue Temperature. E. MITTELMANN, E. E., PH. D.; S. L. OSBORNE, PH. D., and J. S. COULTER, M.D. Arch. P. T., March 1941.

Side Effects of Short Wave Therapy and Their Prevention. HEINRICH G. BRUGSCH, M.D. Arch. P. T., March 1941.

Electrotherapy

Aneurysm of the Internal Carotid Artery within the Skull: Wiring and Electrothermic Coagulation. SIDNEY C. WERNER, M. D.; ARTHUR H. BLAKEMORE, M.D., and BARRY G. KING, PH. D. J.A.M.A., Feb. 15, 1941.

Wave Diathermy Electrode: A New Modification. RALPH O. RYCHENER, M.D. Amer. J. Ophthal., March 1941.

The Effects of Direct Currents Upon the Electrical Excitability of Nerve. A. ROSENBLUETH. Amer. J. Physiol., Feb. 1, 1941.

Epiphyseal Injuries

Slipping of the Upper Femoral Epiphysis. End Results After Conservative Treatment. M. FORRESTER-BROWN, M.D. J. Bone and J. Surg., April 1941.

Epiphyseal Dislocations in Scurvy. WALTER SCOTT, M.D. J. Bone and J. Surg., April 1941.

Eye, Ear, Nose and Throat

Physical Therapy in the Field of Otolaryngology: Highlights of Some Specifically Adapted Conditions. LEWIS J. SILVERS. Med. Rec., Dec. 18, 1940.

Diagnosis and Treatment of Tuberculosis of the Larynx and Contiguous Areas. GEORGE E. WILSON, M.D. Arch. Otolaryng., Feb. 1941.

Weve Diathermy Electrode: A New Modification. RALPH O. RYCHENER, M.D. Amer. J. Ophthal., March 1941.

Physiotherapy in Ophthalmology. W. THORNWALL DAVIS, M.D. Digest Ophthal. and Otolaryng., March 1941.

Fractures

The Medical Management of Fractures. CHARLES F. NELSON, M.D., and ROLAND C. NELSON, M.D. Brit. J. Phys. Med., Feb. 1941.

Complete Dislocation and Fracture of the Astragalus Following Minor Injury. GEORGE D. BERCOVITZ, M.D. Bull. Hospital for Joint Dis., April 1941.

Volkmann's Ischemic Contracture. J. Chart. Soc. M. and M. Gym., April 1941.

The Principles of the Modern Treatment of Fractures. J. PATRICK. J. Chart. Soc. M. and M. Gym., April 1941.

Fractures in the Neck of the Femur in Children with Particular Reference to Aseptic Necrosis. BRANDON CARRELL, M.D., and W. B. CARRELL, M.D. J. Bone and J. Surg., April 1941.

Spontaneous Fracture of the Femoral Neck Following Irradiation: Report of a Case. LENOX D. BAKER, M.D. J. Bone and J. Surg., April 1941.

Fractures of the Distal Half of the Tibia and Fibula. E. H. JUERS, M.D. Minn. Med., Mar. 1941.

Common Fractures of the Elbow in Children. EDWIN O. GECKELER, M.D. Hahnemannian Monthly, Feb. 1941.

Modern Treatment of Compression Fracture of the Spine. P. C. CANYAL, M. B. J. Indian Med. Assoc., Dec. 1940.

Hand Injuries and Diseases

A Case of Multiple Enchondromata of the Small Bones of the Hands Treated Conservatively for Fifteen Years. LOUIS S. NELSON, M.D. Bull. Hospital for Joint Dis., April 1941.

Infections of the Hand. SUMNER L. KOCH, M.D. J.A.M.A., March 29, 1941.

Treatment of the Superficial Injuries and Burns of the Hand. HARVEY S. ALLEN, M.D. J.A.M.A., March 29, 1941.

Purposeful Splinting Following Injuries to the Hand. H.C. MARBLE, M.D. J.A.M.A., March 29, 1941.

Treatment of Tendons in Compound Injuries of the Hand. STERLING BUNNELL, M.D. J. Bone and J. Surg., April 1941.

Hyperpyrexia

Cardiovascular and Systemic Morbidity Following Hyperpyrexia in Central Nervous System: Syphilis. ALAN A. LIEBERMAN, M.D., CHARLES J. KATZ, M.D. Illinois Med. J., Feb. 1941.

Evaluation of Hyperpyrexia in General Medicine. HAL M. DAVISON, M.D., MASON I. LOWANCE, M.D., and WM. R. CROWE, M.D. Arch. P. T., Dec. 1940.

The Effect of Artificial Fever Upon Liver Glycogen. LUCILLE LOSEKE, M.D. and MILLARD F. GUNDERSON, PH. D. Arch. P. T., March 1941.

Pregnancy and Fever Therapy. JOHANN R. MARX, M.D. Brit. J. Phys. Med., Jan. 1941.

Knee Injuries

Physiotherapy of the Internally Deranged Knee-Joint. DR. E. JOKL. J. South African Soc. Physio., Feb. 1941.

Football Injuries to Knee Joint. DON H. PALMER, M.D. Northwest Med., April 1941.

Dislocation of the Knee Joint. ARTHUR KRIDA, M.D. Brit. J. Phys. Med., Feb. 1941.

Low Back Pain and Sciatica

Sciatic Pain in Low-Back Derangements: Its Incidence, Significance and Treatment—A Symposium. Eleven articles by well-known authors. J. Bone and J. Surg., April 1941.

Miscellaneous

The Radio and High Frequency Apparatus. Abst. in J.A.M.A., Feb. 15, 1941.

Newer Trends in Hospital Plans and Equipment. EDWARD F. STEVENS. Hospitals, October 1940.

Diseases of the Respiratory Tract and Air Conditioning. CAREY P. MCCORD, M.D. J.A.M.A., Mar. 29, 1941.

Artificial Respiration and Inhalation: The Principle Determining the Efficiency of Various Methods. YANDELL HENDERSON, PH. D., and J. MCCULLOUGH TURNER, PH. B. J.A.M.A., April 5, 1941.

Roentgenographic Study of the Carpal Canal. VERNON L. HART, M.D., and VALERIA GAYNOR, R. T. J. Bone and J. Surg., April 1941.

Bursitis. H. STIMSON, M.D. Brit. J. Phys. Med., Jan. 1941.

The Treatment of Wasted Muscles After Injury (Concluded) SIR MORTON SMART. J. Chart. Soc. M. and M. Gym., Feb. 1941.

An Experiment in Camping for Spastic Children. Crippled Child, April 1941.

Results of Electric Shock from X-Ray Apparatus. Queries and Minor Notes, J.A.M.A., Jan. 18, 1941.

Urticaria Solaris: Review of the Literature and Report of a Case. HARRY L. ARNOLD, JR., M.D. Arch. Derm. and Syphil., April 1941.

Muscle Testing

Muscle *Testing Around the Shoulder Girdle. A Study of the Function of Shoulder-Blade Fixators in Seventeen Cases of Shoulder Paralysis.* SIGNE BRUNNSTROM, M. A. J. Bone and J. Surg., April 1941.

National Defense

Important Role of Physical Therapy in the National Defense Program. Editorial, Arch. P. T., April 1941.

Nervous and Mental Injuries and Diseases

Cardiovascular and Systemic Morbidity Following Hyperpyrexia in Central Nervous System: Syphilis. ALAN A. LIEBERMAN, M.D., CHARLES J. KATZ, M.D. Illinois Med. J., Feb. 1941.

A Study of Paralytic Scoliosis on Five Hundred Cases of Poliomyelitis. PAUL C. COLONNA, M.D., and FREDERICK VOM SAAL, M.D. J. Bone and J. Surg., April 1941.

The Orthopedic Aspects of Poliomyelitis. M. FORRESTER-BROWN, M.D. J. Chart Soc. M. and M. Gym., Feb. 1941.

Peripheral Vascular Diseases

Use of Short Wave Diathermy in the Study of Peripheral Vasospasm. MAURICE HARDGROVE, M.D., and S. A. MORTON, M.D. Wisc. Med. J., Feb. 1941.

Sensitivity of the Smallest Blood Vessels in Human Skin to Graded Mechanical Stimulation. SAMUEL R. M. REYNOLDS, PH. D., J. R. DIPALMA, B. S., and FRANCIS I. FOSTER, B. S. Medical Times, April 1941.

Tendon Injuries

Significance of Function in Tendon Repair. MICHAEL L. MASON, M.D. Arch. P. T., Jan. 1941.

Calcification of the Supraspinatus Tendon: A New Treatment. G. F. DICK, M.D., L. W. HUNT, M.D., and J. L. FERRY, M.D. J.A.M.A., Mar. 22, 1941.

Ultraviolet Radiation

Carcinogenesis by Ultraviolet Rays with Reference to Wavelength and Energy. H. P. RUSCH, M.D., B. E. KLINE, M. S., and C. A. BAUMANN, PH. D. Arch. Pathol., Feb. 1941.

Present Status of Ultraviolet Radiation. FRANK H. KRUSEN, M.D. Arch. P. T., April 1941.

Present Status of Radiation Therapy in Nasal Sinusitis. ALFRED G. LEVIN, M.D. Arch. P. T., April 1941.

Serum and Tissue Phosphatase Determinations as an Aid in Evaluating the Radiation Therapy of Bone Tumors. HELEN Q. WOODARD, PH. D., and N. L. HIGINBOTHAM, M.D. J.A.M.A., April 12, 1941.

Spontaneous Fracture of the Femoral Neck Following Irradiation: Report of a Case. LENOX D. BAKER, M.D. J. Bone and J. Surg., April 1941.

Ultraviolet Irradiation of Auto-Transfused Blood in the Treatment of Acute Peritonitis, General. E. W. REBBECK, M.D. Hahnemannian Monthly, April 1941.

Vocation

Employment of Physically Handicapped. D. L. LYNCH, M.D. J.A.M.A., March 29, 1941.

Vocational Adjustment of the Handicapped. GEORGE LAVOS. J. Except. Child., March 1941.

Philadelphia Letter Shop. FRANK B. ALLEN. Crippled Child, April 1941.

ABSTRACTS

John S. Coulter, M.D.

The Use of Physically Induced Pyrexia and Chemotherapy in the Treatment of Subacute Bacterial Endocarditis

William Bierman, M.D., and George Baehr, M.D. In J.A.M.A., 116:4:292, January 25, 1941.

Our experience would indicate that physically induced pyrexia enhances the value of chemotherapy in the treatment of subacute bacterial endocarditis. Of 2 cases reported, one was due to Streptococcus viridans and one to B. influenza, in which recovery occurred and the patients have been well for two years and for ten months respectively. A third patient, with Streptococcus viridans endocarditis, has been well for four months, but this interval is still too brief to describe as a cure. In 13 cases the disease was influenced by the therapy only temporarily or not at all. These clinical results support the *in vitro* observations of White that the effectiveness of the sulfonamide drugs is materially enhanced at sustained higher elevations of temperature.

Physical Therapy in Fractures about Elbow Joint

Miland E. Knapp, M.D. In Arch. P. T., 21:12:709, December 1940.

In fractures about the elbow joint it is essential that treatment be begun as early as possible and that the reduction be absolutely maintained. Prolonged immobilization itself may cause protracted disability.

In supracondylar and transcondylar fractures of the humerus our best results have been obtained by maintaining immobilization for about ten days to two weeks and then removing the splint for treatment in the whirlpool bath. This bath supplies heat and mild massage which relieves pain and reduces swelling. The patient is then instructed to flex and extend the elbow slowly and carefully as far as possible without pain. Pronation and supination are also performed in the same manner. It is extremely important that the joint should never be forced. It is stressed that treatment must never produce pain but should relieve it to some degree. The splint is then reapplied. It is usually found that the range of motion possible without pain increases quite rapidly with physical therapy. At the end of three or four weeks of treatment, if satisfactory motion has not been obtained, it is determined by x-ray, if possible, whether the limitation is due to callus formation or some other cause.

If callus limits motion, usually at 160 to 170 degrees, treatment is discontinued and active use of the arm is advised, because full motion will return in time without active therapy other than exercise.

Fractures of the capitellum or of the lateral condyle just proximal to it are troublesome at the best. If reduction could be obtained by closed methods the results are fairly good. However, if open reduction is resorted to, the results are poor with resultant loss of carrying angie, myositis ossificans or limitation of motion.

Fractures of the head of the radius present difficult problems. If they are of mild degree, immobilization at right angles for 5 to 10 days followed by active motion in the whirlpool bath usually will yield rapid return of function. However, more severe fractures of the radial head require open operation and removal of the fragments. If this is done some impairment of function is almost certain to supervene. This, however, can be reduced to a minimum by early active motion as outlined above. Immobilization after this operation performs no useful function and, in my opinion, only adds to the disability.

Dislocations of the elbow with or without fracture of the coronoid process of the ulna should be treated by early motion. If the dislocation has a tendency to recur, thus indicating an extensive tear in the joint capsule and ligaments, it is well to maintain immobilization for ten days or two weeks in a right angle splint to allow healing of the tear before starting active motion in the whirlpool. However, usually only two or three days after reduction the splint can be removed for treatment and then reapplied.

Severe fractures of the olecranon are commonly opened and wired or held in place with vitallium screws or heavy catgut. If the internal fixation is adequate and no immobilizing splint is used, very little or no physical therapy is required. If the elbow is immobilized in extension, physical therapy is very difficult and the treatment is prolonged.

Present Status of Short Wave Diathermy In Nasal Sinusitis

A. R. Hollender, M.D., F.A.C.S. In Arch. P. T., 22:1:12, January 1941.

Dr. Hollender believes that:

1. The scientific utilization of short wave diathermy for nasal sinusitis presupposes careful selection of cases.

2. From the standpoint of clinical effect, when short wave diathermy is indicated in nasal sinusitis, there seems little or no difference whether air-spaced electrodes, rubber condenser electrodes or the electromagnetic field with cable are used, so long as correct technic is followed.

3. It is reiterated on the basis of more extensive studies that short wave diathermy is of value as an aid to indicated procedures solely in acute sinusitis.

4. Allergic sinusitis and hyperplastic sinusitis are contraindications to local heat in any form.

5. Observations on the value of short wave diathermy as a postoperative aid have been disappointing, demonstrating more conclusively the futility of applying this agent in chronic sinusitis.

6. While the empiric use of heat in any form is irrational in chronic sinusitis, short wave diathermy because of its deep heating qualities is sound therapy in acute exacerbations of this condition for relief of pain and improvement of drainage.

7. It is probable that short wave diathermy fails in chronic sinusitis because of fixed tissue changes which do not yield to most local nonsurgical procedures.

The Management of a Case of High Blood-Pressure

(*Essential Hypertension*)

H. Wallace Jones, M. D. In Practitioner, CXLVI, 2:72, February 1941.

In the management of any given case the mode of life must be so regulated as to prevent mental and physical strain. Long hours of work must be avoided, and patients whose occupation carries more than the average amount of anxiety and worry should be ordered to take a period of rest or relaxation for half an hour to an hour after the midday meal, before beginning the work of the afternoon.

Adequate holidays also have a very important place in the treatment of hypertension and, when the rise in blood pressure is persistent and resistant to other methods of treatment, a long rest from work may be required.

Alcohol and tobacco both tend to raise the blood pressure, especially if indulged in to excess.

Diet.—Meat and especially red meat, should be given up entirely in severe cases and considerably reduced in all but the mildest types, and meat soups and beef-tea, which contain extratives, must be cut out completely. Mutton, lamb, bacon and ham are less harmful than red meat but should be curtailed.

When the raised pressure is accompanied by obesity, the total quantity of calories must be reduced in addition to the elimination of the special articles of diet already mentioned.

Drugs.—The use of drugs should be considered under three main groups: the sedatives, vasodilators, and diuretics. The chief value of the sedative group is in the treatment of those cases in which there is a dominant factor of nerve strain or anxiety. Moreover in another large group of cases, although this factor may not be dominant, there often is an underlying anxiety or business worry which may aggravate the condition and retard recovery. Bromides, phenazonum, luminal and theominal, are the most useful drugs for this purpose, and of these luminal is probably the most valuable either given alone, in doses of ½ grain, two to four times a day, or combined with theobromine as theominal in 5-grain doses, once or twice a day.

Spa treatment has its place in the treatment of the condition, as many patients who are unwilling to submit at home to dietetic restrictions, and who take little exercise, often will submit cheerfully to the regime of a spa as part of their "cure."

Diathermy is a useful method of treatment for patients who do not improve readily when treated by other methods. For the hypertension itself long wave diathermy is of most value, a current of ½-1 ampere passed between electrodes placed on both wrists for a quarter to half an hour three times a week often will cause a small but definite fall in the pressure with as a rule a considerable improvement in the symptomatology. When there is intermittent claudication present as well, this frequently is relieved by passing the current between both ankles as well as through the wrists.

When there is angina of effort with the hypertension, ultra-short wave diathermy through the chest, front and back, often improves the exercise tolerance of these patients and enables them to walk much farther without getting the pain, and may eventually cause its disappearance.

Hypotension

H. J. Starling, M. D. In Practitioner, CXLVI: 2:77, February 1941.

Friedlander sums up the views of various authors by stating that the factors which maintain the blood presure at normal levels are:

(1) Force of cardiac contraction.
(2) Condition of vessel walls.
(3) Peripheral resistance to blood stream as determined by the vasomotor system.
(4) The blood volume and the physical state of the blood itself and its viscosity.

He considers the third factor the most important, and quotes the work of Dale, Laidlaw and Krogh, who show that the capillaries constitute an actively contractile part of the vascular system, having an intrinsic tone which can be modified by nervous or chemical influences.

Massage to the abdomen and limbs, followed by passive and then active exercises, should be begun as early as possible. Before sitting up or getting out of bed a tight abdominal binder should be applied. A remarkable improvement, amounting in many cases to what may be termed a cure, is effected by the wearing of a ***firm lower-abdominal support.*** The type I have used consists of a metal shield which covers the lower half of the abdomen, pressure on which is obtained by lateral steel springs ending in pads, which rest on either side of the lumbar spine and are brought together at the back by a strap. Such a support brings the level of a proptosed stomach a good deal higher, but it must also raise the intra-abdominal pressure and prevent an undue accumulation of blood in the splanchnic plexus. Some women object to this type of belt, for which may be substituted a good make of sports corset, the upper level of which does not reach higher than the umbilicus.

Minimum Standards for Convalescent Hospitals

E. H. L. Corwin, Ph.D. In Hospitals, 14:12:23, December 1940.

A convalescent institution is not a vacation home or a custodial home or a chronic disease hospital. It is a medical institution designed for patients recovering from acute illnesses, operations and exacerbations of illnesses which may be chronic in their nature.

At the present time there are practically no facilities for post-hospital care of patients who have had operations for brain tumor and for whom a certain amount of improvement is to be expected. Several conditions in the dismal realm of neurology which were considered hopeless a few years ago are now said to be benefited or cured if given proper care over extended periods of time. Among these are deficiency states, such as subacute combined sclerosis, pellagra and some forms of muscular atrophies. Convalescent institutions for neurologic patients should be rather more elaborate with regard to equipment and personnel than is necessary in general homes. Equipment for hydrotherapy and physical therapy should be provided, and a great deal of emphasis should be laid on recreational and occupational therapy as well as on the selection of the proper type of physical therapist and occupational therapist.

In the case of orthopedic patients the concept of convalescence should extend beyond the patient's stay in a convalescent home. A physical handicap may make it necessary for the patient to find a new outlet for his economic usefulness. A complete orthopedic convalescent program, therefore, should include training to fit the patient into a new occupational pattern. Vocational training is hardly possible in a convalescent institution unless it be of a specialized type.

The Treatment of Chronic Infectious Arthritis

Morgan W. Matthews, M.D. In New Orleans Med. and Surg. J., 93:8:396, February 1941.

Physical therapy is merely an adjunct to other treatment in arthritis. Alone it does not cure arthritis, and the use of this measure to the exclusion of other anti-arthritic treatment does not produce the best results. However, it is probably the most important single procedure used in the treatment of arthritis. Its main value is to increase the blood flow to the affected area, thus aiding in the removal of waste products and hastening the absorption of inflammatory exudates. It also increases local nutrition, relaxes muscular spasm and often relieves pain. Types of physical therapy employed in arthritis are heat, massage and exercise. Heat may be applied in a number of ways, as contrast baths, paraffin baths, heat lamps, infra-red lamps, electric bakers, diathermy, hot baths, cabinet baths, steam baths, mud baths and fever therapy. The valuable agent in all of these methods is heat, and the form selected should be one that the patient is most likely to apply over a long period of time.

Many patients with arthritis have the delusion that joints must be exercised as much as possible in order to prevent stiffness. During the acute stages of the disease one or two gentle movements of the affected joints should be performed daily. In this manner dense adhesions and subsequent ankylosis are prevented. As the patient improves, the amount and the type of exercise is modified and increased. The golden rule governing the amount of exercise to be taken is that any motion which is attended or followed within twenty-four hours by an increase in pain, swelling or stiffness in the exercised joint is excessive. The proper time for both massage and exercise is after the application of one of the forms of heat previously mentioned.

In all cases attention must be paid to correct posture, flat or pronated feet. In flattening of the longitudinal arch of the feet the use of felt pads molded to conform to the arch of the foot affords much comfort. In pronated feet the Thomas heel may be employed. Patients having painful metatarsophalangeal joints often are benefited by having transverse metatarsal bars placed on the soles of the shoes. Proper fitting shoes with sensible heels should be demanded. Ambulatory arthritics with painful knees frequently obtain much relief following the proper application of a three-inch elastic bandage to the affected joints.

There is no single remedial agent that is constantly effective in the treatment of chronic infectious arthritis. Therapeutic measures, each of which alone has but little value, when combined frequently induce and maintain satisfactory remissions in the activity of the disease. The treatment of this disease should be a long range program, so arranged as to be conducted over a period of years. It should be on a broad and comprehensive basis similar to that employed in pulmonary tuberculosis. Therapeutic efforts directed towards improving the general physical condition of the patient are most likely to be successful in the largest number of cases.

Combined Artificial Fever-Chemotherapy: In Gonococcic Infections Resistant to Chemotherapy

H. Worley Kendell, M.D., Donald L. Rose, M.D., and Walter M. Simpson, M.D. In J.A.M.A., 116:5:357, February 1, 1941.

These authors come to the following conclusions:

1. Eighty-three patients suffering from complications of gonorrhea, resistant or intolerant to chemotherapy, have been treated with artificial fever, either alone or combined with chemotherapy.

2. Of those refractory patients receiving fever therapy alone, only 12.5 per cent were cured following a single eight-hour treatment at 106.6 F.; 62.5 per cent were cured following a single ten-hour treatment at 106.6 F.

3. When combined with artificial fever, the effectiveness of chemotherapy (sulfanilamide or Promin) is influenced by the time-dosage relationship with respect to the fever treatment; when administered immediately prior to or during the treatment.

4. A ten-day period of intensive sulfanilamide therapy prior to fever therapy is without value in sulfanilamide-resistant patients, provided none of the drug is present in the body fluids at the time of the fever treatment.

5. All of the 31 unselected consecutive patients treated with sulfanilamide or Promin for eighteen hours before a single ten-hour fever session at a rectal temperature of 106.6 F. were cured.

6. Rigid bacteriologic criteria were employed as the chief basis for the determination of cure.

7. The combination of a single ten-hour session of artificial fever therapy combined with the administration of adequate sulfanilamide or Promin for eighteen hours prior to the fever therapy treatment appears to be the procedure of choice in the treatment of chemotherapy-resistant gonococcic infections.

Hysterical Contractures Following Injuries in War

Sir Arthur Hurst, M. A. D. M. In Clinical J., LXX:2:29, February 1941.

Hysterical contractures and paralysis may result from injuries to the soft parts of the limb, with or without the bones and joints being involved. The commonest cause is a wound of the hand, foot, forearm or leg, the symptoms generally developing below and above the injury as well as in its immediate neighborhood. In many cases no nerve is involved, but in others temporary concussion of one or more peripheral nerves or of the brachial plexus may have occurred, or they may have received some actual injury of a recoverable nature. The severity of the symptoms does not vary with the degree of infection or the extent of the injury, which often is trivial.

The patient is made to understand that any treatment he has already received has prepared the way, so that nothing now remains but a properly directed effort on his part, with our help, for complete recovery to take place. During the whole course of treatment he is engaged in conversation, and the meaning of each successive step is carefully explained. He is made to watch the contraction of the muscles and the play of the tendons of the normal limb, and to attempt to imitate them in the affected one.

In cases of this kind the patient often expresses astonishment at the simplicity of the treatment, which succeeds in curing him in a few minutes, in spite of the fact that he has previously been given massage and electricity for months without any obvious results. The explanation is that now for the first time he is made to take an active part in the treatment—to use his will power, instead of allowing himself to become a passive agent in the hands of the masseuse. A few masseuses and electrotherapists realize the importance of active effort, but I frequently have seen a patient reading a newspaper which he holds with one hand, while his other hand is being massaged or treated with electricity, exactly as if it did not belong to him. I have, indeed, very rarely seen a patient being encouraged throughout his massage or electrical treatment to take an active part in the proceedings. As a matter of fact, neither electricity nor massage is of any use in these cases, although the massage and electrotherapy departments of military hospitals were crowded with them during the last war. For recovery should take place very rapidly, and then nothing but the ordinary activity of everyday life is required to restore any residual weakness due to the muscular atrophy caused by prolonged disuse.

In many cases of severe contracture more active manipulation is required.

We found that in almost every case it was possible by explanation and persuasion to get him to relax his muscles, so that passive movements could be carried out with the production of little or no pain, however powerful the spasm might be. When little or no resistance to passive movements persists, they are combined with and finally replaced by active movements until the condition of the limb is normal.

Passive movements are most effective if carried out by the medical officer himself, as the patient is engaged in conversation the whole time and made to take an active part in the movements from a very early stage in the first sitting. For this reason we never employed mechanical appliances for performing passive movements. Even when complete relaxation of spasm has been attained and the normal movements have been restored to a hand, the patient is very apt to forget this and to continue to make the other hand do the work of both. It is therefore important to give the patient some occupation, such as basket-making or toy-making, which will necessitate his using both hands from the very day on which recovery occurs. At the same time the patient is instructed to be careful to use both hands for all ordinary purposes, such as dressing and feeding himself, and in the case of the right hand he should at once begin to write with it again.

Optimal Dosage In Short Wave Diathermy

Milton G. Schmitt, M. D. In Arch. P. T., 21:12:716, December 1940.

Schmitt believes that the desired physiologic effect from short wave diathermy is the establishment and maintenance of an active hyperemia. The depth heating characteristic of short wave diathermy is of singular advantage, but nevertheless we may be guided in its application by the general rules governing the use of the simple, effective therapeutic agent—namely, heat. The tolerance of inflammatory tissue for heat is always less than that of normal tissue; therefore, the tolerance of normal tissue for heat is an unreliable and unsafe guide for determining the power input per unit tissue volume. A high frequency wattmeter is a valuable aid in determining total power input. Optimal dosage is the smallest power input per unit tissue volume which will establish and maintain an active hyperemia, the application of which must endure for such time and be repeated at such intervals as are necessary to produce an accumulative beneficial effect. The greatest danger of short wave diathermy is overheating; therefore, its occurrence should be avoided. Insulation against loss of heat and distribution of the electrical input permit the maintenance of the desired local hyperemia with a minimal electrical input per unit tissue volume and prevent excessive heating of the pathologic zone. Distribution of the power input to the tissues beyond the pathologic zone is of advantage in overcoming associated pathologic and trophic disturbances in contiguous tissues. When an optimal power input to the pathologic zone is employed, there is no contraindication to the maintenance of a continuous or continual active hyperemia by the application of short wave diathermy. For prolonged and frequent applications of short wave diathermy the electromagnetic induction field is the method of choice because of its physical adaptability to secure desired distribution of the power input, its applicability to all anatomic parts, and its established heating characteristics.

Observations on Reflex Responses During Prolonged Periods of Human Refrigeration

Temple Fay, M. D. In Arch. Neuro. and Psychiatry, 45:2:215, February 1941.

Neurologic studies were made on 42 patients during a state of reduced generalized body temperature. These patients received a total of 83 periods of refrigeration. Each period varied in duration from twenty-four hours to five days. Approximately 400 neurologic examinations were made on the patients in this series.

Increase in deep reflexes was found when the body temperature was between approximately 97 and 85 F. At that range of temperature no change in the abdominal reflex was noted. The period of hyper-reflexia corresponded closely to the shivering stage. Abolition of deep tendon, abdominal and gag reflexes occurred when the body temperature approached 78 F.

The pupils remained equal, regular and normal in size throughout the hypothermic period, but response to light stimuli became progressively more sluggish as the body temperature was lowered. The light reflex became abolished at 78 F.

Dysarthria began at a temperature of approximately 93 F., and response to the spoken word became practically nil below 80 F.

Cerebration was progressively delayed with reduction of body temperature. Mental faculties were fairly well preserved until the body temperature approached 93 F.

Retrograde amnesia was present for the period the body temperature remained below 92 F.

Appreciation of pain, heat and cold perception was not lost during or after refrigeration.

The symptom of pain, if present prior to refrigeration, was completely relieved in all but 2 instances (4.7 per cent).

No permanent alteration of objective neurologic responses resulted from hypothermia.

The Effect of Hyperpyrexia on the Secretion and Flow of Bile

S. L. Osborne, F. S. Grodins, L. Goldman and A. C. Ivy. In Amer. J. Physiol., 132:1:32, February 1, 1941.

1. A choleretic effect was produced in anesthetized biliary fistula dogs as a result of hyperpyrexia.

2. In unanesthetized biliary fistula dogs, a significant choleresis was not demonstrated.

3. The probable cause of these diverse results is discussed.

4. No significant effect of hyperpyrexia on the output of the various constituents of bile was observed.

Treatment of War Neurosis

Gilbert Debenham; William Sargant; Denis Hill; Eliot Slater. In Lancet, 1:4:107, January 25, 1941.

The principal conclusions derived from the investigation of a large number of military neurotic casualties are:

1. The nature of the material submitted to hospital varies with the progress of the war, and with the different types of strain that war from time to time imposes. Similar variations can be expected in the future.

2. At times, large numbers of cases will be seen in which there is a semideliberate magnification of symptoms.

3. Treatment has to be adapted to what is possible in a short space of time. It should not be aimed too high.

4. Psychotherapy is faced with unusual difficulties in war-service cases. Both from the structural and therapeutic points of view they closely resemble, with specific differences, unsettled compensation cases of peace-time. Quick abreactive technics have a special value. Special problems are offered by cases with aggressive tendencies and those arising after head injury.

5. Medical first-aid is of the utmost importance. Physical methods of treatment are very useful and should have as a principle aim restoration of normal metabolism.

6. Occupational therapy also is valuable, even more for chronic than for acute cases.

7. Over-optimism is to be avoided, and too much resistance should not be offered to invaliding the patient. The constitutionally unfit must be weeded out of the Army; and for his own sake the unfit soldier should be returned to civilian life fit for work as early as possible.

Full psychological recovery is rare without the restoration of good physical health. The mere appearance of physical fitness often is deceptive, and on inquiry remarkable changes in physique often will be found, including loss of weight. In all forms of drug therapy the aim should be, by a large intake of fluid and food, not only to abolish the anxiety but also to remedy the metabolic disturbances due to, and conducing to, its continuation. Only when his normal physique is restored is the patient fully accessible to psychotherapy and rehabilitation.

The occupational technic worked out at this hospital has been described by Cameron. Occupation is even more valuable for the subchronic than for the acute neurotic, and for a stabilized return to a normal working civil life it is almost indispensable. Its value as a distraction from neurotic preoccupations can be used even during the operation of stress. Our patients were much better when kept at work during air-raids than when allowed to congregate in cover-points and places of greater security. When allowed to seek the greatest available security the men became preoccupied solely with the desire of finding a Utopia where they would *feel* safe, and from spending nights in open trenches the more panicky took to breaking bounds in order to sleep in public shelters. Such breakdown of control has its penalty in heightened anxiety; and the remedy is to deal by sedation with the subjective fears which, rather than the real dangers, are the effective noxus.

Arteriosclerosis Obliterans: A Clinical and Pathologic Study

Edgar A. Hines, Jr., M. D., and Nelson W. Barker, M. D., In Amer. J. Med. Sci., 200:6: 717, December 1940.

Treatment. The limited expectancy of life of patients who have arteriosclerosis obliterans should modify methods of treatment; it is one of the major reasons for not carrying out sympathetic ganglionectomy for these patients. Such measures as fever therapy should be used with extreme caution, if at all, although the intramuscular injection of sulphur may be used safely. Treatment should consist of prophylactic measures, methods to increase circulation, control of pain, and local measures to control ulceration and infection.

General Measures. It is important to maintain the patient's general health and resistance by rest, proper diet and treatment of anemia if it is present. Diabetes should be carefully controlled. If polycythemia vera is present, appropriate measures should be directed against it.

First Impressions of Electroshock Treatment

Lauren H. Smith, M.D., Joseph Hughes, M.D. and Donald W. Hastings, M. D. In Penna. Med. J. 44:4:452, January 1941.

In general, we are surprised at the effectiveness of the electroshock as compared with metrazol. Our series of cases is yet very small; therefore, we can give only our first impressions. Certain of these are as follows:

1. The treatment is simple and inexpensive to apply.
2. The patient experiences no discomfort, as the application of treatment is not painful in any way and there is memory loss for the treatment period.
3. The convulsive episode is less severe than that seen in metrazol.
4. Fractures and dislocations will not occur as frequently (judging from our experience with these few cases).
5. Patients improve rather abruptly on short courses of treatment.
6. No drugs need to be introduced parenterally.

Aside from the points already outlined, it may be generally stated that electroshock will produce any of the benefits or effects of treatment previously experienced with chemical shock. Furthermore, if our experience with the small series of patients is multiplied in the same way with a large series, electroshock will provide a valuable improvement in shock therapy.

The Value of Remedial Exercises In Treatment

Guy H. Fisk, B.A., M.D. In Canadian Med. Assoc. J., 44:2:154, February 1941.

Physicians have neglected the use of exercises as curative procedures, with the result that many quacks, cultists, trainers and others have used them as an entering wedge to obtain a medical practice.

Backache is one of the commonest of all medical conditions. When this is due to postural deformities it can be very successfully treated by exercises. It is seen most commonly in adolescents, but both children and adults also develop the condition and yield very satisfactory results with treatment. In the child with a functional scoliosis the development of structural deformities can be prevented by exercises. In such a case the cooperation of the parents as well as of the patient should be obtained. First, the patient is taught the correct standing posture. All his postural defects in the resting position are corrected in front of a large mirror.

In rheumatism or arthritis exercises have a very important place. In the acute forms of arthritis they are of no value and definitely contraindicated, but in chronic and subacute cases they will prevent the advent of the incapacitating deformities and in many cases enable the patient to earn his living once again. These remarks apply with equal force to the chronic infectious arthritis, traumatic arthritis and the specific infectious arthritis.

Periarthritis of the shoulder deserves special mention. By this term I mean to include the cases of subdeltoid bursitis and "frozen shoulder." These patients require properly supervised exercises to prevent wasting of the deltoid. The patient should be given specific movements to develop abduction, elevation, external and internal rotation of the shoulder.

Sciatica is a condition which shows beneficial results with exercises. After the acute stage has subsided gentle active movements are started. The patient begins by learning to relax. This is best done by having him raise the leg slightly and then allow it to fall on pillows. Pressing the knees together and then letting them fall apart also produces relaxation. After this the patient begins by using the glutei and hamstrings and then works on to the quadriceps and abdominal contractions to mobilize the lumbar spine. Then the range of exercises is gradually increased to stretch the sciatic nerve.

Another form of neuritis urgently requiring exercises is Bell's palsy. Exercises for this condition are best given with a mirror and with the patient screened off from all other patients or alone in a room.

Cases of hemiplegia benefit greatly from exercises. As soon as they have recovered from the preliminary shock, attempts should be made to give passive movements. After a few weeks active movements will be possible. A definite program must then be mapped out for each patient and adhered to so as to give him the feeling that he is progressing.

Disseminated sclerosis responds to exercises if carefully given.

In infantile paralysis a great deal can be done from the start. The exercises should be commenced about six weeks after the onset of the disease when the fever, pain and active processes have subsided. Graduated exercises are given, and care should be taken to see that the weak muscles are never overstretched.

Cases of failing circulation in the legs also can be aided by exercises. Buerger's disease and

arteriosclerotic cases respond very satisfactorily to exercises. The best type of exercises for these cases are those known as Buerger's exercises.

Several pulmonary conditions require exercises in addition to other treatment to obtain complete cures. Of these asthma is perhaps the commonest. By means of breathing exercises a patient can achieve comfort in from one to two months even in longstanding chronic cases. The aims of the exercises in asthma are to teach expiration, diaphragmatic breathing and correct posture. An asthmatic usually maintains a position of inspiration and breathes with the upper part of his chest, and this is what we attempt to eliminate.

Treatment of Recent Colles' Fractures

Samuel P. Newman, M.D. In Rocky Mountain Med. J., 38:3:211, March 1941.

After reduction, immobilization may be accomplished by using a plaster cast. Plaster immobilization is most satisfactory in that it may be molded for the individual case. If a padded cast is applied the plaster may be "pulled on" slightly snugly.

The site of fracture should be reexamined by x-rays within twenty-four hours after the reduction. It should be repeated later if one is suspicious that there has been a loss of position of the reduction.

The postreduction care is equally important to the treatment given for reduction. For the first two or three days after reduction the patient should elevate the hand at frequent intervals to eliminate swelling. The circulation should be checked and the cast split if it has been interfered with. After the first two or three days the patient should be encouraged to use the fingers and thumb actively in gripping and performing minor duties. These exercises discourage the stiffness so commonly seen. In elderly patients it has been my custom to remove the plaster at the end of sixteen to eighteen days and place the wrist in a neutral position but with continued immobilization for another two weeks. In this change, disturbance in the relationship of the fragments should be avoided. Immobilization should be continued until union is sufficient to prevent the fragments from being displaced by the ordinary acts performed by the individual. When immobilization has been discontinued, physical therapy in the form of baking diathermy and massage may decrease the period of disability. Forcible passive movement never should be used. If scar tissue is present it should be stretched rather than torn. Active use returns the function of the extremity quicker, and to a more normal degree, than any other procedure. Active motions may be encouraged by having the patient squeeze a soft rubber ball, pick up small objects, et cetera.

Evaluation of Physical Therapeutic Measures in Facial Paralysis

Richard Kovacs, M.D. In Arch. P. T., 22:3:145, March 1941.

It is generally agreed that electrical stimulation is a useful measure in all cases of facial paralysis, but there appears to be a difference of opinion whether it is to be used from the beginning or only in a later stage.

In a recent study Fischer concludes: "Experiments with electrical treatment starting at various times after denervation demonstrated that the best results are obtained with a treatment starting immediately after denervation, and that the strength and the duration of the electrical currents must be adapted to the changing excitability of the atrophying muscle. It is postulated that the electrical treatment causes mainly a training effect in the denervated muscle, similar to that in normal muscle, which only increases the size of the fibers and their metabolic capacity." In surveying the work done so far the same author states: "Preference of weak and ineffective stimulation for therapeutic use is astonishing." In order that the findings of any experimental work be acceptable for clinical interpretation it should be carried on in a manner comparable to clinical application. It seems significant that in the negative experiments of Chor only ten contractions were administered daily to the gastrocnemius-soleus muscle while in Fischer's work the same muscle was stimulated daily for 12 to 20 minutes.

On the basis of extended clinical use and the above mentioned experimental evidence it would appear that the case still rests on the judicious employment of electric stimulation in paralysis, alongside with heat, suitable support and the earliest possible use of voluntary exercise.

Direct motor point stimulation must be produced by the most effective or most easily tolerated form of low frequency current. This can be either the interrupted galvanic, slow (galvanic) sinusoidal or a modulated alternating current. It is doubtful whether return of function is ever speeded up by such treatment; on the other hand it is likely that it counteracts atrophy of the smaller muscles, just as atrophy of the small intrinsic muscles of the hand in nerve injuries may be combatted by suitable electric stimulation.

Effect of Irradiation of the Air in a Ward on the Incidence of Infections of the Respiratory Tract

David Greene, M. D., L. H. Barenberg, M. D., and Bernard Greenberg, M. D., In Amer. J. Dis. Children, 61:2:273, February 1941.

From our experience during the past three winter seasons with the use of ultraviolet irradiation of the air, we are convinced that this method holds much promise in reducing the incidence of infections of the upper respiratory tract. There are still many obstacles to hurdle before excellent results can be claimed for this method. Some of these obstacles are connected with better ventilation and with the source of light. During the colder months of the year, when windows either are closed or only partially opened, not many changes of air per hour occur in the ward. Under such conditions, the air close to the lamps may be sterilized, but that which is farther away will be only slightly affected by the indirect irradiation. It is obvious that a source of light is needed which will sterilize the air over a wider area than is now possible with indirect irradiation. It is possible that such an effect may be obtained by direct irradiation.

Diagnosis and Treatment of Gout and Gouty Arthritis

Philip S. Hench, M.D. In J.A.M.A., 116:6:453, February 8, 1941.

Treatment of Acute Gouty Arthritis

Cathartic: A brisk cathartic supposedly will promptly evacuate provocative toxins; its use is empiric but apparently helpful.

Rest: Affected parts should be rested completely.

Heat or cold: Simple hot water compresses reapplied every one or two hours are generally effective and often preferable to dry heat.

Colchicine: Colchicine tablets should be given.

Narcotics: Until pain is controlled by colchicine and compresses, a dose or two of codeine or morphine sulfate may be required.

Diet: The diet currently approved for acute gouty arthritis is free of purines and low in fats (the latter inhibits urate excretion), rich in carbohydrates, which increase urate excretion, and rich in purine-free proteins.

Gout is a chronic disease for which treatment must be continued indefinitely in an attempt to prevent or postpone return of symptoms. Contrary to the belief of a few physicians that no regimen materially alters the "relentless progress of gout," most physicians believe that, by adhering faithfully to the interval treatment, the majority of patients can sharply modify the course of their disease, reduce the number and severity of attacks, prevent or reduce the likelihood of chronic gouty arthritis and avoid or postpone the late and sometimes fatal renal and cardiovascular complications.

There is disagreement as to the value of physical therapy (aside from simple heat or cold) during acute gouty arthritis and the intervals thereafter. Most physicians regard massage and exercises to be absolutely contraindicated at any stage of the attacks but helpful as a feature of interval therapy. But "cure crises" often are precipitated by such therapy; hence I do not recommend it.

Treatment of Chronic Gouty Arthritis. — Chronic gouty arthritis may be prevented by the regimen outlined; if not, various types of physical therapy are required, especially heat to foster resorption of urates. Fever therapy or typhoid vaccine reactions have been used occasionally. Massage, exercise and spa therapy must be used cautiously lest an exacerbation be evoked.

The Treatment of Subacute Bacterial Endocarditis: Present Status

S. S. Lichtman, M.D., and William Bierman, M.D. In J.A.M.A., 116:4:286, January 25, 1941.

Among 200 cases of subacute bacterial endocarditis due to Streptococcus viridans and nonhemolyticus collected from the literature and the records of the Mount Sinai Hospital, in which the sulfonamide drugs were administered, recovery occurred in 12, an incidence of 6.0 per cent recovery.

Among 43 patients treated with combined chemotherapy and heparin 5 recovered, an incidence of 11.5 per cent recovery.

Among 24 patients treated by chemotherapy and physically induced hyperthermia 4 recovered, an incidence of 16.0 per cent recovery. Of 21 patients treated by chemotherapy and hyperthermia induced by intravenous typhoid-paratyphoid vaccine, 5 recovered—an increase of 25 per cent recovery.

The number of cases in the three series treated by combined methods is still too small to yield an accurate statistical estimate of the incidence of recovery in each group. This preliminary review of the results obtained thus far is encouraging. The combined methods of therapy seem to promise a greater incidence of recovery than may be anticipated in the natural course of the disease or after treatment with the sulfonamide drugs alone.

Low Back Pain and Trauma

Harry E. Mock, M.D. In Amer. J. Surg., LI:3:779, March 1941.

The author's treatment of compression fractures gradually evolved in the last ten years since he gave up the use of prolonged immobilization and especially the use of back braces is based upon anatomical and physiological facts, namely:

1. The multiple joints about each vertebra.

2. The capsule and adjacent ligaments about these joints, as well as the more distant ligaments of the spine which may be stiffened by prolonged immobilization.

3. The soft tissue changes, the result of atrophy and disuse, which may occur in the muscles and aponeuroses.

4. The need of hyperextension with the resulting muscle and ligamentous pull on the body of the vertebra to overcome the compression. By increasing this hyperextension daily and within the patient's tolerance, the reduction of the fracture can be obtained just as well and with far less danger than by forceful hyperextension under anesthesia, within a period of two weeks.

5. Early mobilization of the joints by allowing hyperextension exercises, and as soon as the hyperextension cast is applied, allowing the patient to walk, usually at the end of three weeks.

6. Maintaining muscle tone and strength and pliable aponeuroses by the daily use of heat and massage, facilitated by turning the patient onto his belly while still maintaining the hyperextension position, and later, after the hyperextension cast is applied, cutting a large circle in the back of the cast for the purpose of continuing heat and massage.

7. The fractured vertebra is healed at the end of eight to ten weeks, depending upon the physical condition of the individual, and at this time removal of the cast. If the physical therapy and exercises have been carefully and properly performed daily, the patient will not feel the need for a back brace or other support. No patient of mine with a compression fracture has had a back brace within the last ten years.

Physical therapy, unless used intelligently, may be far more responsible for the continued low back pain than is the original disease or injury. Given a trivial injury in a nervous individual who shows a tendency to exaggerate his condition, one often can rub in more disabling conditions in a week than he can rub out in a year. The use of diathermy, quartz and other kinds of lights, mechanical exercisers, vibrators and similar apparatus, often serves more to impress the patient with the seriousness of the situation rather than to cure him. Common sense and intelligent hand work are the essential factors in physical therapy to the spine. Rarely is machine therapy indicated. The overly enthusiastic, talkative physical therapy technician, suggesting a curvature of the spine here, a spasm in the muscles there or the presence of painful nodes, is a menace in any back case.

Fractures of Both Bones of the Forearm In Children

Boardman M. Bosworth, M.D., F.A.C.S. In Surg., Gynec. and Obst., 72:3:667, March 1941.

There were 50 patients in this series.

Colles' fractures and epiphyseal separations have not been included in this series. In all but 2 cases both radius and ulna were broken at approximately the same level.

For immobilization, anteroposterior plaster splints were usually applied to include the wrist and palm but not the elbow. In 5 of the 11 cases in which there was over-riding the splint was made to include the elbow; in the 6 others it is not recorded whether the elbow was immobilized. Some form of immobilization was maintained an average of 4 weeks and the patient was discharged after an average period of 5 weeks following reduction, excepting 4 patients who were watched between 3 and 4 months. In only 1 case was it recorded that fluoroscopy was used during reduction, though the fluoroscope may have been used in the others.

Physical therapy consisting of baking and light massage was used in about half the cases, though when it was commenced and how long continued could not usually be determined from the record.

1. During the 7 year period from 1932 to 1938 inclusive, 50 children aged 16 years and under were treated in the outpatient department and wards of St. Luke's Hospital for shaft fractures of both bones of the forearm.

2. Of these, 32 were personally examined and roentgenographed at an average of 5 years following injury.

3. Twenty-five of the 32 were treated by closed reduction with excellent anatomical and functional results in 21 and no bad results.

4. Four were subjected to open reduction with satisfactory results in 3 cases and a good clinical result in the fourth despite a nonunion and pseudarthrosis of the ulna.

In children with shaft fractures of both bones of the forearm, complete anatomical reduction with end-to-end apposition of the fragments is not essential to excellent functional and cosmetic recovery. Open reduction of such fractures in children is rarely indicated.

Book Reviews

L. EMMETT HOLT: PIONEER OF A CHILDREN'S CENTURY. By R. L. Duffus and L. Emmett Holt, Jr., with a foreword by Edwards A. Park, M. D., Professor of Pediatrics, Johns Hopkins University, Baltimore. Cloth. Price, $3.00. Pp. 295, with 19 illustrations. New York and London: D. Appleton-Century, Inc., 1940.

This is the life story of the outstanding figure in American pediatrics of his time as well as one of the great physicians and educators which this country has produced. Luther Emmett Holt was born in 1855 in Webster, New York, a few miles from Rochester, but his background on both sides of the family was straight New England. The first three chapters give an interesting account of the Holt family, their home and the life of Holt until he graduated from Rochester University at the age of twenty "not trained to do anything but teach school."

In the later part of 1876 he made up his mind to study medicine. The description of studying medicine in America in the seventies is most interesting. He first attended the University of Buffalo where there were no laboratories, anatomy was learned from textbooks only, and the teaching consisted of a four months' lecture course on clinical subjects. He later went as a student interne to the Hospital for the Ruptured and Crippled in New York, and while there he registered at the College of Physicians and Surgeons, later affiliated with Columbia University.

When Holt graduated in medicine in 1880 one out of every four babies born in New York City died before the end of its first year. The care of the sick child was in the hands of the obstetrician or the practitioner of internal medicine whose interest was chiefly in adults. In 1924 at the time of Doctor Holt's death a vastly different picture presented itself. Information on infant care and hygiene was the property of practically every educated mother. Practitioners engaging in the specialty of pediatrics were to be found in every corner of the country. Full professors of pediatrics gave extensive courses in practically all medical schools. Research institutes devoting themselves to the study of disease in childhood were springing up in the leading medical centers. These factors were shown in the infant mortality rate for in this period it had come down steadily to less than one-third of the previous figure.

Holt's outstanding contribution to this period, as he once expressed it, was to be a "middleman" of science. His function was to translate the new knowledge into practical results and to diffuse those results far and wide. Nothing illustrates this better than his book for mothers, "The Care and Feeding of Children." It appeared in 1894 as a modest booklet of 66 pages. It went through seventy-five printings and was translated into Spanish, Russian and Chinese.

In 1896 Holt's text, "The Diseases of Infancy and Childhood," brought to its author a position in pediatrics comparable to that achieved by Osler in internal medicine. This story of Holt's life is a document of great interest quite apart from its human appeal.

PHYSIKALISCH-DIATETISCHE THERAPIE NACH KLINISCHEN GESICHTSPUNKTEN. By Dr. Hans—George Scholtz—Dirigierender Arzt der Abteilung fur Physikalische Therapie am Staditschen Rudolf—Virchow-Krankenhaus, Berlin. Cloth. Price, 16.50 RM. Pp. 299, with 93 illustrations. Leipzig: George Theime, 1940.

This book is divided into two parts. The first 113 pages deal with the various physical methods used by the writer and their physiologic effects —hydrotherapy, infra-red, sand, steam, foam, paraffin, carbonic acid and hyperpyrexia baths are discussed and their technic given. The value of balneotherapy is considered and in this section one finds that the author believes the natural iodine bath has marked value in treatment of arteriosclerosis. Those interested in hydrotherapy or mineral water baths will find the sections of balneotherapy and hydrotherapy quite interesting. The application of mud and bog baths are discussed and because they are so little used in this country, the writer's views should prove of interest. Massage, exercise and high frequency present nothing unfamiliar to American workers. The technic for giving the Schnee galvanic as well as the galvanic tub bath is given. A few pages are used to discuss some elementary principles of diet.

The second section of the book is devoted to treatment of disease by means of the foregoing methods. Case histories are given in many instances to illustrate results the author has been able to secure. This particular book is well presented and is not difficult reading. Unless, however, the physical therapist is particularly interested in hydrotherapy, mineral baths or the use of mud or paraffin, this volume would not be of particular interest.

A COLLEGE TEXTBOOK OF HYGIENE. By Dean Franklin Smiley, A.B., M.D., Medical Adviser and Professor of Hygiene in Cornell University, New York, and Adrian Gordon Gould, Ph. B., M.D., Assistant Medical Adviser and Assistant Professor of Hygiene in Cornell University. Third edition. Cloth. Price, $2.50. Pp. 539, with 135 illustrations. New York: The Macmillan Company, 1940.

This is the third edition since 1928 of this popular textbook of hygiene. Several sections have been rewritten and the whole text has been reorganized in such a way as to give more emphasis to the community aspects of this subject. In this edition many of the community health problems are discussed in direct association with the presentation of the personal hygiene subject matter. This scheme of presentation emphasizes the fact that both personal and community hygiene are based upon the same principles and should be coordinated and unified.

There are thirteen sections based upon the various systems of the body with an excellent introductory section, and sections on the specific prevention of certain diseases, the special senses, special health problems of after-college years and modern medicine versus nostrums and quackery. This book is well written and there are many excellent illustrations. An excellent aid to the college student of hygiene is the addition at the end of the book of a glossary of technical terms. A bibliography and reference list of supplementary reading will help the student enlarge his information in any special field in which he is interested. This volume can be highly recommended.

THE NEUROSES IN WAR. By Several Authors under the Editorship of Emanuel Miller, M. A., M.R.C.P., D.P.M. With a concluding chapter by H. Crichton-Miller, M. D., F.R.C.P. Cloth. Price, $2.50. Pp. 250. New York: The Macmillan Company, 1940.

The last world war showed a high incidence of neuroses in civil and military life. Most of the authors of the essays in this volume saw, studied and treated large numbers of the so-called "shell shock" cases during the last war. Some of the authors have been able to continue the study of these cases over periods of years. In this volume this experience is placed at the service of the present military medical officers.

In civil life most physicians refer their nervous and mental cases to specialists, but in the military service medical officers will be obliged to recognize these conditions in the front line if they are with a regiment. In many cases a man's fate before a court martial may depend upon the diagnosis of the medical officer. It is truly stated that the so-called normal man is a dark horse where emotional control in times of stress is concerned; it is difficult to legislate psychologically for him.

There is a most interesting chapter, "The War of Nerves," which should be read by everyone. It defines the different effects of the present war on soldiers and civilians. "The soldier has a definite aim. The dangers inherent in its achievement have been invested with a certain glory from early years in his life. It does not seem incongruous to risk death in attacking an enemy position. In contrast, the civilian today may be called upon to risk death in order that some quite unromantic task should be carried out by the end of a given day. It requires a considerable degree of sophistication to feel that it is worth while to risk death so that a firm's ledger may be kept up-to-date. This can be perceived to be helping his country win a war, but the chain of causality is feeble in the face of strong emotion, such as fear in an air raid. There is little emotional force in this ideal with which to combat or control violent primitive emotions."

The author of this chapter believes that the remedy for civilians is to find some modification of the disciplinary framework that exists in a fighting service and to base the organization of this discipline on the needs of a civil population. This volume can be recommended to all those responsible for community morale.

SOCIAL AND BIOLOGICAL ASPECTS OF MENTAL DISEASE. By Benjamin Malzberg, Ph. D. Cloth. Price, $2.50. Pp. 360. Utica, New York: State Hospitals Press, 1940.

Most tests which deal with the subject of mental diseases stress the individual and somatic aspects of nervous maladies. Usually a brief mention is made to sociologic and general biologic factors. This book deals with the problem of mental health in the State of New York and consists of a wealth of data regarding the incidence of mental disorders at various age periods, in different races, in urban and rural districts. Among other correlations which the author attempts to make from his statistics are included alcoholism and mental disease, literacy and mental disease, et cetera. Although at the present time the practical application of such information offers many problems, such investigations are important in the future planning of mental hygiene.

PHYSICAL MEDICINE: THE EMPLOYMENT OF PHYSICAL AGENTS FOR DIAGNOSIS AND THERAPY. By Frank H. Krusen, M.D., F.A.C.P., Association Professor of Physical Medicine, the Mayo Foundation, University of Minnesota; Head of the Section on Physical Therapy, the Mayo Clinic; Member of the Council on Physical Therapy of the American Medical Association; Past President of the American Congress of Physical Therapy; Past President of the Academy of Physical Medicine. Cloth. Price, $10.00. *Pp.* 846, *with* 351 *illustrations. Philadelphia: W. B. Saunders Company,* 1941.

This is the only volume in recent literature that presents under one cover the modern concepts of physical therapy. Each physical agent is considered under the following headings: (1) introduction — definition — development — present status; (2) physics; (3) source, device or method of production; (4) physiologic effects; (5) technic of application; (6) indications; (7) contraindications, dangers and limitations, and (8) conclusions. This definite and orderly presentation makes this volume extremely useful for quick reference.

This is a practical book. Therefore, the various phases of the subject are discussed in relation to one another and to the entire field of medicine. The complicated physical aspects of the subject are given clearly but briefly. There are excellent illustrations including many which give details for technical procedures. At the end of each chapter there is a complete bibliography that enables the student to follow any given subject to greater length than it could be given in a book of this size.

That this presents a complete consideration of the field of physical medicine can be seen from its contents. The nine parts discuss the following subjects: history of physical therapy; thermotherapy; light therapy; electrotherapy; hydrotherapy; mechanotherapy; clinical aspects of physical medicine; the teaching of physical medicine, and the hospital department of physical medicine. Seldom has a more valuable addition been made to medical literature. Its thoroughness, completeness and authority make it a book that should be in the library of everyone using physical medicine.

SHOES AND FEET. A Text Book for Students and Practitioners. A Practical Consideration of Fifty Affections of the Foot Found in Chiropodical Practice: Their Relationship to Shoes, and Their Elemental Treatment. By Frank J. Carleton, D.S.C., Professor of Mechanical Orthopedics and Lecturer in Shoe Therapy, Temple University School of Chiropody. Foreword by R. Ray Willoughby, B.S., M.D., Dean, School of Chiropody, Temple University. Cloth. Price, $5.00. *Pp.* 357, *with* 156 *illustrations. West Chester, Penna.: Charles H. Andress,* 1940.

The author states that in this practically presented volume no pretense is put forth for scientific achievement in instruction of the profession of chiropody. He believes that the justification for the simplicity of the text offered in a world of ultra-scientific findings is the evidence that to date there has been no published volume on everyday, common complaints which confront the practitioner of chiropody.

If the dictionaries are correct in defining chiropody as the study of the treatment of the minor ailments of the feet, such as corns, bunions, ingrowing nails, et cetera, then this book in several places goes out of this field. Surely a discussion of the diagnosis and treatment of pain in the midtarsal area of the foot comes into the field of orthopedic surgery. In contrast to this there is in this book more good practical material on the construction, measurement and fitting of shoes than is seen in most books on orthopedic surgery. On the whole it can be recommended to those treating minor ailments of the foot.

OFFICE GYNECOLOGY. By J. P. Greenhill, B.S., M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Loyola University Medical School, Chicago; Professor of Gynecology, Cook County Graduate School of Medicine; Attending Gynecologist, Cook County Hospital. Third edition, revised and enlarged. Cloth. Price, $3.00. *Pp.* 424, *with* 116 *illustrations. Chicago, Illinois: The Year Book Publishers, Inc.,* 1940.

The value of this book may be judged by the fact that this is the third edition in two years. This is a book for the general practitioner. It covers in clear language and with many illustrations the medical aspects of gynecology and practically every operative and nonoperative procedure in gynecology that may be carried out in the physician's office. Direct infiltration anesthesia for minor operations is described.

There is a practical chapter on endocrinology as it pertains to gynecology, as well as many others. The author is well qualified to discuss office gynecology from a practical standpoint as he has been conducting classes in this subject for general practitioners at the Cook County Graduate School of Medicine. It is a valuable book for the general practitioner.

AN ANATOMICAL ANALYSIS OF SPORTS. By Gertrude Hawley, M. A., Formerly in charge of Physical Education for Women at Northwestern and Stanford Universities. Cloth. Price, $3.00. Pp. 191, with 97 illustrations. New York: A. S. Barnes & Company, 1940.

This book gives an anatomical basis for the selection of certain sports to the end that the greatest efficiency and athletic success consistent with safety to the body mechanism may be attained. It also makes possible the adaptation of the athletic program to individual needs through an added emphasis upon the relationship of the various sports to the attainment or maintenance of ideal postural patterns. The anatomical analysis of the typical positions and movements involved in the various sports is given in detail. This will promote for coaches a better understanding of the mechanical factors underlying many of the injuries to the joints of the extremities which so frequently occur in practice or in competitive games. This volume is recommended to athletic coaches.

RHEUMATIC FEVER: STUDIES OF THE EPIDEMIOLOGY, MANIFESTATIONS, DIAGNOSIS, AND TREATMENT OF THE DISEASE DURING THE FIRST THREE DECADES. By May G. Wilson, M. D., The New York Hospital and Department of Pediatrics, Cornell University Medical College, New York City. Cloth. Price, $4.50. Pp. 595. New York: The Commonwealth Fund, 1940.

This monograph presents the results of twenty years study of childhood rheumatism. Part one gives a brief historical summary and a consideration of the epidemiology and etiology of rheumatic fever. In the second part the manifestations of childhood rheumatism are described. Part three presents a discussion of the course of the disease in the first three decades with particular reference to the prognosis as related to the manifestations of rheumatic activity. The diagnosis of rheumatic heart disease in children is discussed in part four. In this part there is a chapter on the diagnostic value of exercise tests. Part five considers the general management of the rheumatic child with special consideration of treatment and convalescent care.

The author emphasizes the need for convalescent homes for these children. She believes that until the organization for the care of the rheumatic patient approaches that provided for the tuberculous, the problem of convalescent care will not be solved. Doctor Wilson states: "Although there is no conclusive evidence that adequate convalescent care influences the subsequent course of the disease, there can be no question as to its favorable influence on the immediate course, as demonstrated by more rapid convalescence and striking improvement in general physical condition. It is not fully appreciated that convalescent homes also afford opportunities for educating the child in the principles of a more healthful manner of life within the limits of his own handicap."

There are case records of 647 patients. Each part has an extensive bibliography. The whole subject is presented graphically. In fact, this monograph is a timely and comprehensive contribution on childhood rheumatism.

THE COMPARATIVE PHYSIOLOGY OF RESPIRATORY MECHANISMS. By August Krogh. Publication of the William J. Cooper Foundation. Cloth. Price, $3.00. Pp. 172, with 84 illustrations. Philadelphia: University of Pennsylvania Press; London: Oxford University Press, 1941.

In this monograph the author does not attempt to deal with all the various aspects of respiration. He describes and illustrates (1) the enormous differences in the "call for oxygen" shown by different organisms and under varying conditions; (2) the variations in the accessibility of oxygen in the different habitats occupied by animals, and (3) the adaptation of respiratory mechanisms to these widely varying conditions.

The author, August Krogh, has been Professor of Zoophysiology at Copenhagen University since 1916. He received the Nobel prize in Physiology and Medicine in 1920. This monograph should be read by all physiologists.

TEMPERATURE MEASUREMENT. By Robert L. Weber, School of Chemistry and Physics, Pennsylvania State College. Paper. Price, $2.50. Pp. 171, illustrated. Ann Arbor, Michigan: Edwards Bros., 1941.

Temperature measurement is of fundamental importance in much of the research in physical therapy. This book outlines an experimental study of the methods of temperature measurement with the theoretical principles necessary for their appreciation, intelligent use and extension.

This book presents the substance of a course offered for Juniors by the Physics Department of the Pennsylvania State College. One year of elementary physics is the prerequisite. This is a book which is less formidable than the comprehensive treatises on thermodynamics and yet is sufficiently comprehensive to give general information in the field of temperature measurement and an understanding of its technical terminology.

DIAGNOSIS AND TREATMENT OF ARTHRITIS AND ALLIED DISORDERS. By H. M. Margolis, M.D., M.S., F.A.C.P., Chief, Arthritis Service, St. Margaret Memorial Hospital; Associate in Medicine, Montefiore Hospital; Consultant in Medicine, Pittsburgh Diagnostic Clinic, Pittsburgh. Cloth. Price, $7.50. Pp. 551, with 140 illustrations. New York and London: Paul B. Hoeber, Inc., 1941.

The author states that this book is addressed primarily to the general practitioner, and to the medical student—the practitioner of tomorrow—whose participation is essential in the widening effort to prevent and control the havoc of rheumatic disease. It is divided into eight parts considering atrophic arthritis, hypertrophic arthritis, rheumatic fever, specific arthritides, miscellaneous rheumatic conditions, pain in the shoulder and arm, and low back and sciatic pain. The second part is of special interest to physical therapy technicians because it considers the prevention and correction of deformities and the use of physical therapy in arthritis.

The practicality of the book is well illustrated by the author's discussion on histamine and acetylcholine iontophoresis. He states: "One may doubt whether the average patient with arthritis is justified in trading the known benefits of the simple, daily rite with an ordinary baker, for the more occasional, expensive and elaborate ritual of iontophoresis." In addition to this special chapter on physical therapy, the use of simple physical agents is given throughout the discussions on treatment of the various types of arthritis.

The section on pain in the shoulder and arm has an interesting chapter on the scalenus anticus syndrome. The final part considers over twenty causes of low back and sciatic pain. The consideration of the etiology, diagnosis and treatment of these variety of causes in a little over one hundred pages is necessarily brief, but an excellent bibliography at the end of each chapter enables the reader to look up the subject in detail. This book should be in the library of every general practitioner. It can be highly recommended to physical therapists as an excellent reference book on arthritis and allied disorders.

A LABORATORY MANUAL OF PHYSIOLOGICAL CHEMISTRY. By D. Wright Wilson, Benjamin Rush Professor of Physiological Chemistry, University of Pennsylvania, Philadelphia. Fourth edition. Cloth. Price, $2.50. Pp. 298. Baltimore: Williams and Wilkins Company, 1941.

This is a laboratory manual of physiological chemistry arranged for students familiar with elementary inorganic, theoretical and organic chemistry. It is not intended to be used as a comprehensive reference book.

The experiments and methods which are described have been chosen to furnish knowledge in biochemical technic and to have clinical value. In this fourth edition the experiments on saliva have been augmented and modified. A short discussion of photoelectric colorimetry has been included. This book is an authoritative and valuable laboratory manual of physiological chemistry for medical, dental and veterinary students.

Chapter Directory

Carolina Chapter

President, Mabel Gordan, Duke Hospital, Durham, N. C.

Secretary, Mary Haskell, North Carolina Orthopedic Hospital, Gastonia, N. C.

Central New York Chapter

President, Mrs. Thelma Curley, Percy Hughes School, Jamesville Ave., Syracuse, N. Y.

Secretary, Mrs. M. Stell Murphy, 219 Genesee St., Utica, N. Y.

Colorado Chapter

President, Esther Wilcox, 1251 Emerson St., Denver, Colo.

Secretary, Mrs. Olga Nordblom, St. Luke's Hospital, Denver, Colo.

Connecticut Chapter

President, Mrs. Stephen A. Havanich, Jr., 30 Coleman St., Bridgeport, Conn.

Secretary, Mary Favor, 265 Washington Ave., Bridgeport, Conn.

District of Columbia Chapter

President, Mrs. Florence Harmon, St. Elizabeth's Hospital, Washington, D.C.

Secretary, Laura A. P. Sansbury, Washington Medical Bldg., Washington, D.C.

Eastern New York Chapter

President, Marguerite Stillman, 17 Dove St., Albany, N.Y.

Secretary, Grace L. Berry, 124 Rosa Road, Schenectady, N.Y.

Georgia Chapter
President, Mrs. H. J. Price, Emory University, Ga.
Secretary, Alice Lou Plastridge, Warm Springs Found., Warm Springs, Ga.

Illinois Chapter
President, Coralynn Davis, 5949 W. Circle Ave., Chicago, Ill.
Secretary, Helen Hartigan, 1511 E. 51st St., Chicago, Ill.

Indiana Chapter
President, Adelaide L. McGarrett, 4505 Marcy Lane, Indianapolis, Ind.
Secretary, Ethel C. Scofield, James E. Roberts School, Indianapolis, Ind.

Iowa Chapter
President, Loraine Frost, 15 W. Davenport Street, Iowa City, Iowa.
Secretary, Helen S. Foss, Children's Hospital, Iowa City, Iowa.

Maine Chapter
President, Mary P. Clancey, 67 Gray St., Portland, Me.
Secretary, Mrs. Ruth A. O'Brion, 2 Charles Road, Cape Elizabeth, P.O. Portland, Me.

Maryland Chapter
President, Mrs. Henry O. Kendall, 3 Englewood Road, Baltimore, Md.
Secretary, Jane Ewing, 3313 Liberty Heights Avenue, Baltimore, Md.

Massachusetts Chapter
President, Florence L. Kenney, 264 Brookline Ave., Boston, Mass.
Secretary, M. Lella Dwyer, 59 Sawyer Ave., Dorchester, Mass.

Michigan Chapter
President, Norma Graham, 25 E. Palmer Ave., Detroit, Mich.
Secretary, Eleanor Parmalee, 464 Maplehurst Ave., Ferndale, Mich.

Minnesota Chapter
President, Georgia May Schori, Shriners Hospital, Minneapolis, Minn.
Secretary, Lillian Hubmer, 2515 Nicollet Ave., Minneapolis, Minn.

Missouri Chapter
President, Blanche Marvin, St. Joseph's Hospital, Kansas City, Mo.
Secretary, Margaret E. Wiley, 1307 S. Noland Rd., Independence, Mo.

New Jersey Chapter
President, Mary P. Sweeney, St. Barnabas Hospital, Newark, N. J.
Secretary, Laurel Moore, 176 Woodland Ave., Verona, N. J.

New York Chapter
President, Mrs. Rochelle Winstanley, Vet. Hosp., Kingsbridge Rd., New York, N.Y.
Secretary, Margit Aden, 50 E. 10th St., New York, N.Y.

Northern California Chapter
President, M. Caroline Wells, 888—33rd St., San Francisco, Calif.
Secretary—Gertrude S. Randle, U.S. Marine Hospital, San Francisco, Calif.

Ohio Chapter
President, Mrs. Charlotte J. Patterson, 195 S. Columbia Ave., Bexley, Columbus, O.
Secretary, Enid J. Fifield, Randall J. Condon School, Cincinnati, O.

Oregon Chapter
President, Jennie Hunter, 4005 S. E. Stark, Portland, Oregon.
Secretary, Hazel G. Hardy, 574 N. Lombard, Portland, Ore.

Pennsylvania Physiotherapy Association, Inc.
President, Mr. S. Paul Campbell, 2523 Mansfield Ave., Drexel Hill, Pa.
Secretary, Mrs. Helen Fidler Kenney, 313 S. Smedley St., Philadelphia, Pa.

Rhode Island Chapter
President, Elinor Sherman, Rhode Island Hospital, Providence, R. I.
Secretary, Isabelle O'Hern, 81 Sumter St., Providence, R.I.

Santa Barbara Chapter
President, Helen Oakley, 1421 State St., Santa Barbara, Calif.
Secretary, Mabel Ward, 1421 State St., Santa Barbara, Calif.

Southern California Chapter
President, Margaret Andrews, 3610 W. 17th St., Los Angeles, Calif.
Secretary, Elizabeth A. Hughes, 370 N. Rampart Blvd., Los Angeles, Calif.

Texas Chapter
President, Kathryn F. Brown, John Sealy Hospital, Galveston, Texas.
Secretary, Verna Mae Schuster, Memorial Hospital, Houston, Texas.

Virginia Chapter
President, Alice N. Jones, 318 W. Franklin St., Richmond, Va.
Secretary, Elsa M. Lange, 1536 West Avenue, Richmond, Va.

Washington Chapter
President, Toinette Balkema, 21 Prospect Ave., Seattle, Wash.
Secretary, Evangeline Courtney, Swedish Hospital, Seattle, Wash.

Western Michigan Chapter
President, Louise Holt, County Bldg., Kalamazoo, Mich.
Secretary, Karla Stanek, 138 Fellows St., Kalamazoo, Mich.

Western New York Chapter
President, Jean C. Bailey, 880 Lafayette Ave., Buffalo, N.Y.
Secretary, Mrs. Mary Jones, 125 Riverside Ave., Buffalo, N.Y.

Wisconsin Chapter
President, Mary Ellen Reedy, 715 S. Jackson St., Green Bay, Wis.
Secretary, Inez Christensen, 308 E. Washington Ave., Appleton, Wis.